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ABSTRACT

The purpose of this manual is to provide vocational educators with evaluation elements and tested models which can assist them in designing evaluation systems. Chapter 1 provides several sets of criteria for inclusion in any general program evaluation. The eleven general areas for which criteria are included are administrative procedures, curriculum design, staff development, articulation and coordination, liaison activities, student-related activities, recruitment and advising, placement and followup, expanded opportunities, facilities and equipment, and evaluation. Chapter 2 discusses some specific educational concepts and techniques which have implications for vocational evaluation, including achievement variables and taxonomies. Chapter 3 addresses the concept of evaluation models. These six models are presented and discussed: Accreditation, Tylerian, CIPP (context, input, process, and product., CSE (Center of the Study of Evalution), Formative and Summative, and Single Subject Design. Chapter 4 focuses on procedures to design a comprehensive evaluation system which includes data collection. Sample charts, tables, grids, and reporting forms are presented. Appendixes provide selected sample instrument formats representing the following categories of program evaluations: student assessment, teacher assessment follow-up, employee surveys, and the general category of evaluation. (YLB)

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SELECTED MODELS AND ELEMENTS OF EVALUATION FOR VOCATIONAL EDUCATORS

by

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and

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FOREWORD

The purpose of this manual is to provide vocational educators with evaluation elements and tested models which can assist them in designing evaluation systems. Through the selection of appropriate evaluation mechanisms, vocational educators will be better able to determine the efficacy of current programs. Included is a practical how-to-do-it guide with numerous models which can be adapted or modified to fit any situation.

Our emphasis on the use of criteria as an evaluation tool should aid in the development of local guidelines. The selected models focus on systematic vocational evaluation at all levels. The appendices illustrate several contemporary evaluation forms by which to judge both curriculum objectives and instructional processes.

These models are presented to busy vocational educators so they may adapt those which are appropriate to their own local situations.

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CHAPTER 1

CRITERIA FOR VOCATIONAL PROGRAM EVALUATION

INTRODUCTION

Evaluation of any vocational program or project is often a complex yet subjective activity. Often the evaluator or evaluating team is inexperienced in evaluation and may rely on intuitive or impressionistic approaches--despite books, monographs and articles written about the subject. Often there is no specific program evaluation model which is appropriate to a local situation. Too, there even seems to be a resistance to the concept of evaluation since the term usually denotes reward or punishment. The writers of this guide recognize these problems and attitudes. We also recognize the key role which an evaluator plays in the judging of staff competence and program development. Thus, this monograph is addressed to those who are responsible for vocational evaluation so that they may become knowledgeable about the assumptions which undergird any evaluation system. Included are selected evaluation models and sets of evaluative criteria. All of these elements can then be used collectively to build models appropriate to any individual situation.

Some Tenets Associated With Evaluation

Evaluation, per se, and, more specifically, evaluation of vocational programs must be viewed as a process rather than as an all encompassing procedure. If one seeks "THE" evaluation procedure, then that person soon discovers that no single evaluation procedure will ever fit the many facets of

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We wish to acknowledge the work of Betty A. Ohrt which is represented, in part, in this chapter.

vocational education.

To be most successful, evaluation cannot be viewed simply as a "management tool" but as a means to an end--the improvement of programs or individual performances. This assumption should help overcome teacher and administrator resistance since evaluation then becomes both useful to those involved and informative to decision-makers. Evaluation also becomes flexible and is treated as an ongoing activity aimed at identifying both program strengths and weaknesses. Such a perspective also uses evaluation as a process for continuous redirection of terminal outcomes. The choice obviously involves program directors, instructors, administrators and local citizens.

To be sure, specific assessment and measurement procedures are used to evaluate a specific training program. But, the essence of such activities is to provide meaningful feedback.

The latter point leads to our next tenet. Evaluation must be used as an objective element of the decision-making process. As an aid to decision-making, an evaluator (often the vocational director) must determine the areas to be examined, sources of data, methods of analysis and evaluation procedures to be employed in this process.

An evaluation plan. When viewed as a helpful tool, the evaluation process provides a very important base for decision-making related to the characteristics, scope of the operations, and conduct of the program. The evaluation process provides insights into what has happened (the past) and hints at what could be (the future). To implement these perspectives, at least five aspects of evaluation should be considered in the planning phase.

First, one must formulate a clear statement about what specifically is to be evaluated. Included in those specifications are all of the related activities. This step requires definition and identification of all programs, program participants, and other elements to be observed.

Second, an evaluation design must be created that meets your specific needs. Consideration must be given to time and fiscal factors and the availability of personnel who will be involved in the evaluation process.

Third, a decision is needed to determine how the design plan is to be implemented.

Fourth, there is need to plan how the findings will be reported, to whom they will be reported and what deadlines must be met in producing and disseminating the final report.

Finally, a procedure must be instituted to provide feedback to those involved in the program operations. This mechanism will help to insure positive attitudes toward evaluation.

The above overview of the general phases of an evaluation program leads to the definition of your program. This usually consists of a brief description of each vocational program being evaluated with already established and defined program objectives.

Program objectives are often derived from general criteria--either stated or assumed. The latter ultimately determines the type and structure of evaluation model most suited to your needs. To aid in the identification of criteria, we will provide a number of evaluative criteria. You may choose or adapt those most suitable to your situation. In this manner, you can build your own model, tailored specifically to your program needs. Our plan will also provide elements for building of models which may be applied to departmental, module and course evaluations. Thus, we are building this monograph as one which focuses on user decision-making. You must decide on those elements which will help you to expand your own evaluation potential.

Evaluation As Planning

Prior to illustrating evaluation criteria models or designs, we would like to note that evaluation can also be a planning technique (decision-

making, if you wish).

Planning, according to Kenneth H. Hansen (1967), has at least six elements which tend to be uniformly agreed upon: (1) identification of the problem, (2) analysis of problem components, (3) statements of solutions and alternatives, (4) solution tests for reality, (5) establishment of the organization to accomplish the changes, and (6) implementation of change decisions. These six elements, are similar to the so-called scientific method of inquiry.

One major problem in vocational education planning is to identify the procedures which may be used in programmed or sequential steps to initiate the previously identified desired changes. To this end, there are several systematic planning methods that can be used. All program plans tend to require some type of "needs assessment." The exact determination on the kinds of needs and the assessment to take place is traditionally accomplished in an intuitive manner. However, if significant feedback is to be provided, the requirement mandates that planning procedures move from an intuitive mode to a rather highly organized and systematic method.

We caution that "needs assessments" must essentially be recognized as the interpretation of "wants." When persons are polled to obtain a list of "vocational needs," the usual list will be those activities, skills, competencies, or concerns that are desired by the respective respondents. The "vocational wants" list must then be translated to a "needs" list; that is, how do the desired ends (wants) become operational.

Evaluation (and often the planning) of vocational education programs traditionally relies on external evaluators such as accreditation teams, ad hoc visitations teams who are invited to examine the totality of a presented program, or a local advisory committee. The reports of these teams are, by and large, devices which tend to focus on general conditions but not on feedback.

The reasons for making the above sweeping indictment are as follows: (1) the accreditation reports address themselves to generalities; (2) the criteria by which programs are judged tend to be very general; (3) the intermittent characteristic of advisory committee reports means that at least one or more years will transpire before there is concerted preparation for the follow-up visitation; (4) in most instances, the advisory committee members rely on data which are collected, presented, and interpreted by the evaluatee--hardly an objective source; (5) meaningful base line data are not accumulated, nor are they maintained on a year by year basis; (6) the teachers and vocational directors seldom pay serious attention to a report unless it is so grossly negative that it would threaten accreditation or someone's job; and (7) feedback is seldom directed to specific components of the vocational program.

To alleviate the shortcomings of nonsystematic longitudinal evaluations which neglect planning, we again stress that vocational evaluation must be viewed as a continuous process--one that, in reality, proceeds without end!

We quickly recognize that any evaluation is usually composed of two main kinds of data: (1) objective descriptions and (2) value-laden judgments. The importance of the first of these cannot be underestimated. The validity of the value judgment is dependent in large part on the accuracy of the information used to make these judgments. In addition, objective data collection also affords a basis for decision-making and a means to plan for implementation of value judgments.

John K. Hemphill (1969) established a series of characteristics which described the process of evaluation. Hemphill's list of six criteria which pertain to evaluation are listed below.

1. The problem is determined by the situation and because of its complexity may involve many definers.

2. The task of evaluation is to test generalizations rather than a set

of specific hypotheses. The absence of verifiable and empirical knowledge must often be filled by relying on judgment and experience.

3. Value judgments are appropriate at all stages of an evaluation study.

4. Each evaluation study is unique to a situation and can seldom be replicated.

5. Data collection is determined by feasibility and value judgment.

6. Randomization is extremely difficult or impractical to accomplish. Only superficial or selective control over the multitude of variables is possible.

When applied to vocational education evaluation Hemphill's six criteria illustrate a pragmatic view based upon consideration of specific situational goals and conditions, i.e., local conditions.

Subjectivity is an element of any evaluation. The "art" of evaluation is to blend the objective and subjective for the betterment of the program. What could be included? Let us examine that question next.

SELECTED VOCATIONAL PROGRAM EVALUATION CRITERIA

Several sets of criteria for inclusion in any general program evaluation are listed below. Choose as many or as few criteria as you deem necessary for your evaluation plan. To provide for a complete, yet not totally comprehensive, program evaluation, criteria are listed from several areas. The criteria may be compiled and then converted into an evaluation instrument which could serve as an effective tool for measuring various processes, products, inputs and outputs. In this section we have identified only 11 program areas. These eleven general areas include selected criteria for the following:

1. Administrative procedures
2. Curriculum design
3. Staff development

4. Articulation and coordination
5. Liaison activities
6. Student-related activities
7. Recruitment and advising
8. Placement and follow-up
9. Expanded opportunities
10. Facilities and equipment
11. Evaluation

While these areas could be expanded greatly, we are providing a few criteria which seem general enough to warrant universal application. In later chapters of this monograph, we will address specific processes and some procedures by which to evaluate courses, modules, projects and programs.

The criteria which are listed below could also act as a check list with a continuum of responses so that you might determine a relatively accurate profile on a broad spectrum of vocational program elements. Or, you might simply use the criteria as a "yes" or "no" list of functions that are or are not currently performed.

Criteria for Administrative Procedures

1. The procedures by which programs may evolve are written and made available to students, teachers, administrators and counselors.

2. Appropriate levels of resources (money, space, time) are planned and allocated for all vocational-technical programs.

3. The decision-making environment exemplifies an interaction among administrative staff, counselors, vocational teachers and other subject teachers.

4. Vocational programs are supported by the board, administration, counseling staff, teachers and students at least equally to other major school programs.

Criteria for Curriculum Design

1. Vocational program objectives are systematically re-evaluated to determine if changes are needed to reflect the current state-of-the-art.

2. Program objectives and requirements are known and supported by the faculty and other students.

3. Program projects have relationships to other subject areas.

4. Opportunities exist for integration of both females and males into the totality of all vocational training programs.

5. Opportunity is provided for completion of a defined program for those entering the program.

6. Curricula are kept current through surveys, advisory committee feedback and community employment opportunities.

7. Consideration is given to factors which prevent students from completing programs--absenteeism, tardiness, behavior problems.

8. Instruction is geared toward individual development based on some individual assessment of needs and abilities.

9. Program goals include ethical standards and practices.

10. Communications and human relations are integrated within instructional subjects.

11. Vocational youth organization activities are included in the instructional and vocational experience programs.

12. The work ethos including skills, knowledge, attitudes, and pride in quality work surrounding any specific occupational segment are found in classwork, laboratory or experience settings.

13. Teachers regularly visit training sites to keep up-to-date.

14. Written training plans are developed for each student which account for the individual, general, or vocational objective and proposed occupational experience program.

15. Individual student program outlines (objectives) can be altered or changed to be brought into line with performance through student-teacher conferences.

16. Actual experiences in the occupational field are provided through cooperative efforts or simulated settings.

17. A combination of directed vocational experiences and/or simulated experiences are provided in appropriate clinical settings.

18. Each student may choose an appropriate course of study with cooperative guidance and counseling services being offered.

Criteria for Staff Development

1. Administrators participate in local business, civic and labor organizations.

2. Inservice programs attempt to integrate both sexes for continual professional development.

3. Teaching staff meet appropriate state certification requirements for the special areas in which they teach, have recently completed occupational experience, are proficient in those skills being taught, and engage in professional growth activities.

4. Inservice education and staff development programs are provided on a regular basis to provide for teacher assistance and training in areas of need or those emerging as new areas.

5. First aid and emergency measures are offered as part of the continual staff development process.

Criteria for Articulation and Coordination

1. Complementary objectives and goals are developed within the total educational program.

2. Teachers have support of specific advisory committees for the course content and vocational techniques being utilized.

3. A transfer system is available to ensure smooth transition with little or no loss of credit from one school or program to another.

4. General education aspects of the educational program are articulated within the vocational program.

Criteria for Liaison Activities

1. Conferences for students, teachers and parents are a part of the program.

2. The Advisory Committee provides up-to-date information on current trends and developments in the community as they relate to vocational-technical programs.

3. Advisory Committees with adequate representation of the vocational-technical fields are organized, functioning, establishing standards and designing evaluative criteria for the program.

4. Advisory Committees help to place students and graduates into jobs.

5. A community occupational employment assessment is conducted systematically to determine employment opportunities.

6. Employment trends and needs of the community are actively reviewed by vocational staff which include teachers, counselors, administrators.

7. Support for vocational programs comes from employees and business agents in the form of recommendations, employment and other support.

8. Resource persons from all vocational areas are invited to assist in acquainting students with career opportunities.

9. Vocational teachers act as liaison persons with the community and assist in conducting community relations.

10. The program attempts to develop personal and occupational development, efficient and safe work habits, and positive attitudes toward work, as well as sound employer-employee relationships.

Criteria for Student Related Activities

1. Students are encouraged and prepared to participate in future follow-up surveys.

2. Extra-curricular activities are available for vocational students as well as other students.

3. Opportunities are provided for student leadership development in conjunction with related vocational organizations.

4. Activities of the vocational youth organizations tend to be planned, implemented and evaluated by students.

5. Vocational youth organizations are open in membership and participation to all students regardless of sex or racial origin.

6. All student organizations have supporting and advising services of the faculty and administration.

Criteria for Recruiting and Advising

1. Teachers and students have sufficient understanding of tests and the meanings of the results so that the advising process is enhanced.

2. Appropriate vocational counseling assistance is available for students so that aspirations, interests, aptitudes, and personal physical limitations may be reviewed against the availability of occupational choices.

3. A system of referrals to vocational-technical programs is developed with teachers, counselors and community members.

4. Career occupation information, including vocational-technical occupations, is developed and made available at all appropriate grade levels.

5. Any conference involving students, their family and instructors is summarized and filed with appropriate confidentiality.

6. Recruiting methods are utilized to insure a continuous flow of students with appropriate interests and aptitudes which can insure full utilization of the vocational resources.

Criteria for Placement and Follow-up

1. Students have access to the job market through a wide range of entry mechanisms.

2. Placement services, available to all graduates and alumni, are organized and provided by the school.

3. A relatively high percentage of the graduates are placed in the vocational field for which they are prepared.

4. Job opportunities are listed and updated so that students may utilize the information.

5. Follow-up surveys of graduates are conducted to determine employment status.

Criteria for Expanded Opportunities*

1. Continuing education classes and activities are provided to those already in the work force.

2. Access to ongoing vocational programs is available for those wanting to re-enter the work force or to upgrade their vocational skills.

3. Provision is made for the full acceptance and integration of adult students returning to the educational scene.

4. Open access is provided to all vocational programs for those classified as handicapped. Appropriate support and special services are available to ensure an adequate success rate for handicapped students.

5. Open access is provided for all students from ethnic minority groups.

6. Open access is provided to women for training that has been traditionally provided to a male audience.

7. Provisions are made to recruit and integrate women into vocational programs.

*Several of these criteria may be appropriate only at post-secondary institutions.

Criteria for Facilities and Equipment

1. The supply of equipment (including tools, supplies, machines) is sufficient to conduct a quality program.

2. Physical facilities, equipment and instructional materials are appropriate to the occupational groups included in the program.

3. Adequate working space and storage facilities are available to each student.

4. Textbooks and other instructional materials are systematically selected, current and accessible to students.

5. Safety checks and regulations are adhered to at all times.

Criteria for Evaluation

1. Data are obtained from follow-up surveys to provide evaluative criteria by which to judge educational objectives and improve the quality of offerings.

2. A plan for continuing and systematic internal evaluation is established.

3. Representative groups actively participate in occupational needs assessment, program planning and evaluation.

4. All levels of participants (students, parents, teachers, community business leaders) are involved in ongoing program evaluations.

5. Ongoing evaluations are established for objectives, content, methods, outcomes and student performances.

6. Individual development is promoted through the use of evaluation of individual progress toward individual goals as well as a comparison with other students.

7. Student evaluations are conducted regularly on work attitudes and habits, occupational development and relationship with employer.

8. "Feedback" and findings from evaluation efforts are used in curriculum changes.

In Closing

The above list is general in scope and addresses several general elements for program evaluation. The list is incomplete; yet, it illustrates the kinds of criteria that can be established by which to design and conduct general program evaluations. Now, let us discuss some selected evaluation-related techniques which can be applied to vocational education.

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CHAPTER 2

USING EVALUATION RELATED TECHNIQUES IN VOCATIONAL EDUCATION

Just as one major component of vocational education is teaching, another is evaluating. This chapter discusses some specific educational concepts and techniques which have implications for evaluation. As was noted in Chapter 1, the planning process is a critical element in the systematic development of any vocational education program. Now, we present a few selected concepts of the evaluation process. The achievement variables of evaluation will be the focus of the first discussion.

ACHIEVEMENT VARIABLES

Achievement Tests

Achievement tests are constructed to assess a student's terminal behavior or the expected behavior or attainment of the student after completion of an assignment, unit, module or course. Achievement tests are developed to assess the degree or quality to which the desired behavior or performance takes place. Such test scores show a level of present skill development. Achievement tests are contrasted with aptitude tests which measure a relationship between present performance or behavior and future acquisition of knowledge and/or skills in a specific area. In short, aptitude tests are constructed to predict future success in some specific area. In vocational education, the major stress is usually on the here and now, not the future; thus, achievement testing needs some elaboration.

Achievement scores provide two types of information: (1) the student's level of skill and/or knowledge relative to an established level of mastery,

and (2) the relative ordering (rank) of the student's score in relation to the rest of the class. Robert Glaser (1963) refers to the first type of information as criterion-referenced measures and states that these measures depend upon an absolute standard of quality. This means that the student either has or has not acquired the pre-determined mastery level of the skill. The degree of skill attainment is usually stated in some descriptive term. The second type of information is usually referred to as norm-referenced since it compares a student with other students in a select group.

Glaser refers to the student's level of achievement as occurring somewhere on a hypothetical continuum of knowledge or skill proficiency ranging from zero (The student cannot perform a specific weld, repair a typewriter, balance a budget.), to mastery (The student can perform a specific weld, repair a typewriter or balance a budget.).

Generally, achievement tests are norm-referenced. However, there has emerged yet another major emphasis, that of criterion-referenced tests. Let us examine them and their logical extension to the concept of mastery.

Criterion-referenced tests (CRT). Marvin C. Alkin (1974) notes that three definitions of criterion-referenced tests exist with each being applied in varying circumstances. The first definition is that of Robert Glaser and Anthony J. Nitko (1971) who refer to a criterion-referenced test as one that is intentionally designed to produce scores which may then be directly interpreted regarding previously specified performance levels related to mastery of the subject. These performance levels are established through the definition of the domain or group of behaviors or sets of knowledge which the student should be able to perform or know at the end of a unit, module, or course.

The second definition is coined by Major L. Harris and Deborah Miller Stewart (1971) who write that a "pure" criterion-referenced test is one which

contains items drawn from the domain or class or behaviors defined as necessary for mastery of the subject. The CRT contains only a sample of behaviors or sets of knowledge drawn from the domain of reference. The students score indicates the level of student success of mastery of the domain behaviors or knowledge.

W. James Popham and T.R. Husek (1969) report a third acceptable definition in which a CRT is used to determine a student's status regarding a performance standard or a set criterion. They suggest establishing the student's performance in relation to the subject's mastery.

These three definitions may differ in the constraints which are placed on the criterion-referenced test, but they share three common characteristics: (1) common concern relative to test organization, (2) selection of the individual test items, and (3) assessment in relation to a pre-determined set of performance behaviors or criteria.

Mastery. Assumed within criterion-referenced tests is the concept of mastery. Defining mastery has been and continues to be a problem for all vocational educators. Mastery learning has been defined in a variety of ways. Benjamin S. Bloom (1968) summarizes the basic premise by uniting many approaches. He observes that if a normal distribution of student aptitude or potential is assumed, i.e., a large number of students have average potential. Another assumption is that a smaller number have either more or less than average potential. The type and quality of instruction PLUS the time allotted for learning to occur is adjusted to meet the individual needs and characteristics of these students. If one combines all these assumptions, then most of the students should be expected to attain a mastery level of the subject. Bloom notes two types of mastery.

The first is that the mastery of a skill or set of knowledge allows the student to transfer the learning to a new situation. Given a hypothetical or

real situation where a weld is needed, the student will select the appropriate one for the materials and situation.

The second type of mastery refers to the percent or number of items passed on a test. The instructor sets 80 percent as the mastery level, and the students attaining that percentage on the test are considered to have reached mastery.

Related to these two types of mastery is the problem of whether to base mastery upon the selection of a correct answer or the production of an answer. An example of this problem is the selection of an accurately written or pictorial description of a proper weld as opposed to the actual production of an accurately written or pictorial description of a proper weld. To be consistent, if transfer of learning is to take place, then the student should actually be able to produce a proper weld in a variety of situations.

Other scales. Major L. Harris (1971) establishes five measurement scales which he felt were directly interpretable without referring to the scores of other students. Four of the scales are easily applicable to vocational education. The mastery level of these scales may be determined on a subjective basis according to individual instructor decisions. Four of Harris' scales are listed below.

1. Rate scale--The amount of time a student takes to finish a specific task, e.g., 15 minutes to complete a specific task.

2. Sign scale--The student can or cannot perform a specific task and does or doesn't achieve mastery of the task. For example, can the student produce a specific weld or balance a wheel, on a single-item performance test?

3. Accuracy scale--The number of times, proportionately, the student successfully completes a specific task. For example, the student accurately balances a wheel in three of the four times that the task is attempted.

4. Proportion scale--The portion of a group of test items, selected from

a previously defined domain of mastery performances, in which a student has shown mastery (knows or can perform). For example, the student can perform three of four different types of welds.

Assumptions of CRT and mastery. Assumed under the concept of mastery and criterion-referenced tests is the further assumption that there does exist a domain of correct responses, performances, or behaviors. A domain of reference for appropriate behaviors relative to a specific content area needs to be thoroughly defined. This domain should not be confused with the cognitive, psychomotor, perceptual or affective domains as defined by Bloom (1956), Simpson (1966), Moore (1967), and Krathwohl (1964). These will be discussed later. Careful delineation of the domain of correct behaviors assists in test construction and student evaluation. When using "domains," specific test items are referenced directly to the prescribed correct behaviors which have been defined as components of mastery. The components of instruction may be linked to match the student learning objectives with evaluation techniques. This action would be applying the concept of "domain referencing."

Problems of mastery. The concept of mastery learning has at least four unresolved problems: (1) a working definition of mastery does not exist; (2) setting some percentage point as a mastery level without determining criteria for establishing a mastery standard is arbitrary; (3) the use of one score as the indicator of mastery does not account for the wide range of student abilities and needs; and (4) the whole of any one skill cannot be feasibly evaluated.

Another concomitant problem of using a mastery approach and also one of CRT is that there is total convergence of the specified learner objectives, the performance of the learner, and the evaluation. For example, in vocational educational classes the emphasis is usually on the completion of some "hands on" activity, skill or product. ("Experiential" is the proper term.)

While we have discussed at great length the use of various written tests as evaluation tools, we must note a caution. The term "Certified Mechanic" means that a mechanic volunteered to take a rigorous written examination to test his or her knowledge about the trade. The tests are now nationally administered through the National Institute for Automobile Service Excellence, a non-profit corporation based in Washington, D.C. The tests are developed and administered through the Educational Testing Service (ETS) of Princeton, New Jersey. In addition to passing the examination, a mechanic needs at least two years of experience as a mechanic.

What we wish to illustrate by the above example is that most mechanics, if not nearly all, work at Benjamin S. Bloom's cognitive level 3--application. However, the test, being a paper and pencil type, cannot test application, per se. Through a series of implied and inferred assumptions, if a mechanic can pass a paper and pencil test, then that mechanic can certainly repair an automobile. Quite obviously there is a discrepancy in the manner in which a mechanic truly behaves on the job. Mechanics repair automobiles; they do not take paper and pencil tests when doing so.

The creation of actual performance tests which are converted to paper and pencil tests takes a great deal of time, thought, skill and creativity. By the way, multiple choice tests are easily adapted to meet most vocational education situations. Our concern is that the students have experience with paper and pencil problems similar to the testing conditions--prior to ever taking the tests!

To do a better job of testing, there are at least three major aids--the so called "Taxonomies." Let's focus on them as means of improving the evaluation process.

TAXONOMIES

Different types of learning result from different learning experiences.

A vocational teacher who plans to teach (help the student to learn) various outcomes must plan, execute, and evaluate accordingly.

The Concept of Taxonomy

The concept which undergirds all taxonomies as decision-making tools is simply this: not all teacher or student behaviors are the same. Some are different from others and, accordingly, elicit different responses from the student and teacher. That is, if the teacher acts differently, the student will respond in different ways. From this we might infer that the student then is learning.

Teachers may be observed by the different actions they perform. These actions might be formulating performance objectives, or they might include questions to be asked or test items to be administered. Within these clusters of teacher actions or behaviors (performance objectives, questions, test items), not all actions are the same. To illustrate, there is a great difference between the questions: "When did Henry Ford invent the Model T?" and "Did Henry Ford really invent the automobile industry?" One way of examining these differences is to apply the cognitive taxonomy, often referred to as "Bloom's Taxonomy." The taxonomy is basically a classification system which educators can use to observe, compare, and evaluate performance objectives, questions, written materials, and evaluation methodologies (tests). But, first let us discuss the concept of learning/teaching taxonomies.

What do we mean by a taxonomy? A taxonomy is basically a classification system, a way of grouping selected objects together such as plants, animals, performance objectives or questions. But we consider a taxonomy to be something more than just a classification system. What differentiates a taxonomy from a classification system is that a taxonomy is hierarchical in characteristic; that is, a taxonomy is a classification system with a hierarchy of classes. Not all the classes are at the same level. The method by which the

classes are arranged in a hierarchy depends upon the organizing principle and the type of taxonomy.

In the taxonomy of the animal kingdom, the phyla are arranged according to evolutionary complexity. Thus the phylum Chordata (animals with back bones) is higher than Porifera (sponges) which is higher than Protozoans. In Bloom's Taxonomy, the organizing principle is that of complexity. Higher levels in the taxonomy are assumed to be more complex than the lower levels. In addition, the higher levels in Bloom's Taxonomy build upon the lower levels. If a student can perform at the third level (application) then we also assume performance at the two levels (comprehension and knowledge). More on this later.

What is meant by cognitive domain? To simplify matters, educators have divided the types of learning which take place in the schools into three areas: Psychomotor, Affective, and Cognitive.

The Psychomotor Domain, as you may recall, deals with the manipulative or motor-skill area (printing, writing, wiring).

The Affective Domain deals with attitudes, interests and values.

The Cognitive Domain concerns knowledge and the development of intellectual abilities plus some skills. Most of the time, teachers at secondary levels are concerned with the "Cognitive Domain" because, traditionally, that is how they have been trained to evaluate.

How can the taxonomy be used? Teaching can be envisioned as a triad of acts: Objectives lead to evaluation which is related to the teaching act which is directly related to the objective. This process is cyclical and, in theory, never ending.

In the above model, the objectives which are formulated should determine the teaching procedures and the evaluation procedures. One can use the taxonomy in each of these processes: in formulating objectives, in developing

classroom questions and learning exercises, and in constructing evaluation instruments or methodologies.

Using a Taxonomy in Vocational Education

For educational tools, such as the taxonomies, to be worthwhile, they must be useful in the following ways. You may even want to add your suggestions to this list.

1. Range of objectives. A taxonomy provides a list of possible ranges of objectives available in any subject. A close examination of the categories may keep a teacher from over-emphasizing one level, such as the knowledge level.

2. Sequencing objectives. An analysis of learning tasks will indicate to the teacher the learning experiences necessary for the student to obtain the intended outcomes. The taxonomy provides a means to sequence learning from simple to complex outcomes. Sequencing also aids in determining the order of presentation.

3. Reinforcement of learning. Since each lower category of the taxonomy is subsumed by the next higher category, reinforcement of previous learning occurs if learning experiences are properly sequenced.

4. Cognitive structure provided. Facts are presented to students in a cognitive structure by being related to concepts, applications or problems. Students are relating facts to larger constructs instead of memorizing isolated facts.

5. Congruency. Once an objective (or question) is written and classified at a particular level, it aids the teacher in selecting more appropriate teaching strategies and evaluating techniques which coincide with the level of the objective. If an objective is written at the application level, learning experiences for students must be provided at the application level. Further, students should be tested or evaluated at that level. If the goal of a

particular Vocational Education course is to teach a person how to asssemble circuits, then the teaching activities should be aimed toward that goal and the evaluation should match. In such an example, a paper and pencil test is incongruent with the learned behaviors.

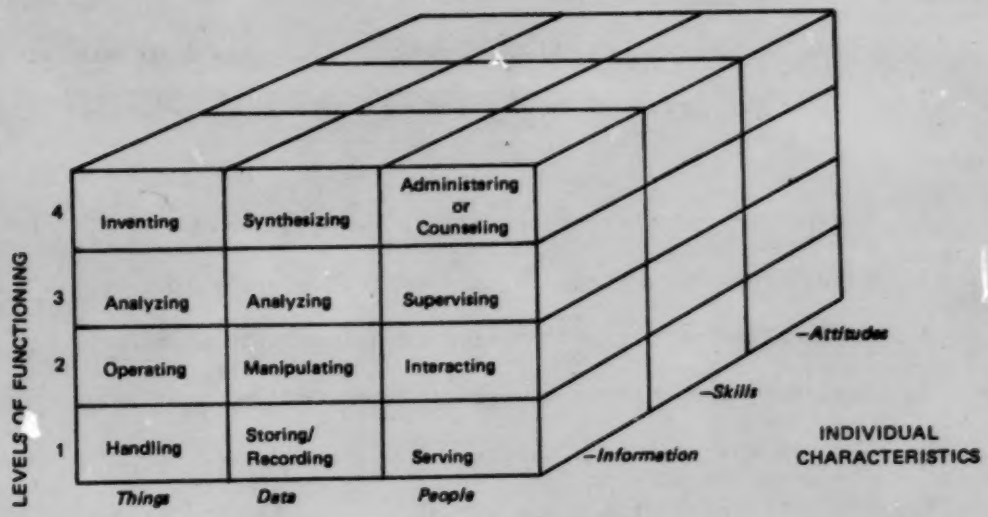
6. Diagnoses of learning problems. Should a student not achieve the intended outcome at the level specified by the teacher, the teacher can systematically examine at which level the student is encountering the learning difficulty, and thereby prescribe additional experiences to help the student overcome a specific learning deficit.

7. Learning to learn. Students are able to perceive that learning can be sequenced according to the relationship of the categories to each other, obtaining a model of learning, which they, too, can use when they leave the classroom.

8. Designing appropriate test items. Teachers who understand the principle of fairness will be quick to use the taxonomy as a self-evaluation of test items. There is evidence to show that most teachers at most levels teach at rather low levels of thinking. Yet, tests are often constructed at higher levels of thinking. This is not fair to the students. A teacher can match learner objective with the test item to determine if the test approximates the level of the objective. This is an application of the concept of congruence.

9. Decision-making. By using a systematic method of analysis, you can decide where the learning will lead and how much time to devote to establishing meaningful prerequisite skills. A taxonomy can thus approximate an instructional road map.

Figure 2-1 illustrates one way of using the totality of the domains to determine the kinds of functions which are needed to implement specific evaluative tasks.



Sequence of Levels of Functioning in Each Activity Area of the Taxonomy

(in ascending order within area)

THINGS	DATA	PEOPLE	
Inventing	**Synthesizing**	**Administering**	**Counseling**
Design	Generalize	Manage	Treat
Create	Theorize	Negotiate	Mediate
Develop	Formulate	Formulate	Advise
			Educate
Analyzing	**Analyzing**	**Supervising**	
Test	Examine	Oversee	
Assay	Diagnose	Direct	
Troubleshoot	Classify		
Operating	**Manipulating**	**Interacting**	
Drive	Compute	Inform	
Control	Edit	Discuss	
Employ	Compile	Instruct	
Assemble	Translate	Persuade	
Handling	**Storing/ Recording**	**Serving**	
Clean	Register	Execute Orders	
Carry	Memorize	Take Instruction	
Stack	Sort	Assist	
Sort	Post	Comply	
Pack	List		

Source: Yagi, Kan, et al. *The Design and Evaluation of Vocational Technical Education Curricula Through Functional Job Analysis*, HumRRO Technical Report 71-15, June 1971. Cited from: John E. Taylor, Ernest K. Montague and Eugene R. Michaels, *An Occupational Clustering System and Curriculum Implications for the Comprehensive Career Education Model*, Human Resources Research Organization, Technical Report 72-1, Alexandria, VA, January, 1972, p. 12. Public Domain Document.

Figure 2-1. Three-Dimensional Representation of Taxonomy

Levels of the Cognitive Taxonomy

According to Bloom, et al., there are six basic levels of cognitive learning. They are arranged in descending order from the lowest level to the highest:

1. Knowledge--remembering, recall or recognition
2. Comprehension--understanding a concept or principle
3. Application--using information in unique situations
4. Analysis--subdividing an aspect into its component parts
5. Synthesis--creating a whole from parts
6. Evaluation--judging via a set of established criteria

An Analysis of the Cognitive Taxonomy

Bloom's Taxonomy has been used as an analytic "tool" since 1956, and an evaluation of the taxonomy in relation to classroom use and other related research seems appropriate. Such an evaluation would not only point out areas of concern, but limitations as well.

On the plus side, the taxonomy has gained widespread acceptance in vocational education and has proven to be a useful tool for curriculum development, textbook writing, and instructional and evaluative planning.

Though research for the most part has validated the hierarchical structure of the taxonomy, this same research has raised several questions. The questions seem to be focused on the lower and upper ends of the taxonomy. However, the questions posed should not overshadow the practical utility of the taxonomy. Further research on the taxonomy should prove instrumental in refining a valuable educational tool with direct implications for curriculum decision-making by the classroom teacher.

This and other cognitive taxonomies provide a convenient reference system for vocational teachers at all levels. It is more difficult to provide educational experiences at the analysis, synthesis and evaluation levels. Perhaps,

vocational educators must simply place more emphasis on application than on the three higher levels. This does not imply that vocational teachers should not attempt higher level areas. Yet, we suggest that vocational educators attempt the latter three to the utmost since the students should have the basic competencies to accomplish higher level skills.

The one major contribution to teaching is that use of the taxonomy brings to the cognitive awareness level the fact that teaching and learning can have a structure. But, the teacher decides what the structure will be.

The Affective Domain

While the Cognitive Domain concerns those "intellectually" related goals of the schools, there is yet another domain which relates to feelings, attitudes and emotions--the Affective Domain. The latter may probably be more important than the former but not in our industrially oriented society. Production and attainment are held in higher esteem than is "feeling good" about something. And, following those societal goals, we shall merely introduce the Affective Domain, knowing fully well that we have done so.

The developers of the Affective Domain* wanted to establish reference points in this vital area so that instructional objectives could be developed within a systematic framework. Five major areas are described in the domain:

1. Receiving
2. Responding
3. Valuing
4. Organization
5. Characterization by a Value or Value Complex

These five areas are then subdivided, just as is the Cognitive Domain. Below

*David R. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia. Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook II: Affective Domain. New York: David McKay, 1964.

is a very brief outline of the entire Affective Domain. You are referred to the source for further study and details just as we used it for the outline presented here.

Receiving. The initial classification in the Affective Domain relates to a learner's ability to be sensitive to happenings in the environment. In short, we want to provide instruction so that students and citizens can recognize that some phenomenon is taking place. To become sensitive, one must demonstrate "Awareness," which is the first subdivision of Receiving. Being aware is only the entry step. This is followed by the category of "Willingness to Receive". The final subdivision of Receiving is "Controlled or Selected Attention". You demonstrated selected attention when you decided to focus on this page, rather than the local newspaper, which may be on the same desk or table on which this monograph is placed.

These behaviors are all controlled by the individual. The individual is cognitively aware that the behaviors are being emitted. Further, think for a moment that the above described affective behaviors can all be taught and learned. That becomes one major contribution of the Affective Domain.

Responding. The second major element in the Affective Domain is called "Responding". While one may be willing to receive, and the like, that behavior needs an action component. Thus, responding behaviors are demonstrated by actually engaging in activities which relate to receiving. "Acquiescence in Responding" is the first subdivision of Responding which is demonstrated when one complies to regulations or conventions, "Willingness to Respond" is the second subdivision. The third subdivision in the major category of Responding is "Satisfaction in Response."

Valuing. The third major category in the Affective Domain is called "Valuing". As may be connoted from the term, it means that one internalizes the concept of "worth." What sets this category in proper perspective is that

the Valuing is exhibited by the individual as a motivated and deliberate action or behavior--not simply the willingness to acquiesce.

There are three subdivisions to Valuing: (1) "Acceptance of a Value," (2) "Preference for a Value" and (3) "Commitment". These three subdivisions are nearly defined in their titles.

Organization. As a learner's experiences broaden, there comes a point where values begin to be ordered, classified or arranged. When such behaviors occur, then that individual is operating at the fourth major category of the Affective Domain--"Organization". Within Organization are two subcategories: "Conceptualization of a Value" and "Organization of a Value System".

Characterization by a Value or Value Complex. The highest category of the Affective Domain is a demonstration of behaviors that shows that an individual acts on a rather consistent basis with those internalized values which the individual holds. In Affective Domain talk (almost like CB jargon) acting as one believes is described as Characterization by a Value or "Value Complex". The first of two subdivisions within the broad category is "Generalized Set," consistent actions or commitment to attitudes, beliefs or values. The final subdivision is "Characterization," which implies that an individual is completely subsumed by the value.

We realize that our treatment is highly abstract, but if you will only ponder on the implications for the schools and the impact of your field on the total environment of the schools, you will quickly generate lists of activities which could accompany those cognitive or intellectual objectives. As Robert F. Mager wrote in the front piece of his book Developing Attitude Toward Learning (1968), "If I do little else, I want to send my students away with at least as much interest in the subjects I teach as they had when they arrived."

A Very Brief Analysis

Recognizing that we have not adequately treated the topic, we will, at any rate, attempt to analyze the Affective Domain as it relates to instruction. In our opinion, this domain tends to generate far too many subcategories for the typical teacher to use. We also infer that the differences between subdivisions are too artificial. Some of the subcategories seem to be very similar to selected categories of the Cognitive Domain. Finally, the time that is needed in the schools to provide all the necessary experiences for both the cognitive and affective dimensions of learning would be overwhelming.

Yet, we can counter, "What are schools for?" The kinds of work and vocational attitudes that are developed in vocational education certainly affect the students. Our attitudes toward learning are school related. Our attitudes about interacting with each other are shaped, in part, in the schools. The belief in one's self is highly school related. All of these aspects are more important than learning and promptly forgetting the difference between transitive and intransitive verbs.

Perhaps, the very best of our vocational teachers subtly interweave both the cognitive and affective consequences in their instruction. Recall that there is a high probability that the teachers whom you liked best, just also happened to teach the subjects that you also liked best.

We don't have the answer to the perplexing problem of merging the Cognitive and the Affective components of instruction: Perhaps one of you now reading this paragraph may synthesize and publish that solution!

THE PSYCHOMOTOR DOMAIN

One of the newer domains to join the taxonomies is that of the Psychomotor Domain which articulates movement instruction in a systematic manner. There are several classification systems developed in this area, while there are few in the previous two domains. The system which we chose to illustrate

is that which the American Association for Health, Physical Education, and Recreation (AAFHPER) has produced:

> Ann E. Jewett and Marie R. Mullan, "Movement Process Categories," from "Movement Processes in Physical Education Teaching-Learning." In, Curriculum Design: Purposes and Processes in Physical Education Teaching-Learning, Washington, D. C.: American Alliance for Health, Physical Education and Recreation, pp. 9-10, 1977.

One mistaken notion that the more "intellectually" oriented teachers often have is that psychomotor skills are of little concern to learning cognitive tasks. We say "mistaken" because, if one analyzes the ways in which we learn, they are anything but static. We move about, coordinating hand-eye movements or leg-hand-eye-brain actions almost continually. Thus, there ought to be included within the curriculum means by which to organize the physical movements associated with living in a systematic manner.

The conceptual framework of Jewett and Mullan's Psychomotor Domain progresses from individual needs to those of social interaction:

1. Fully developed humans
2. Ability to control and adopt the physical environments
3. Ability to relate to others in interactions and culture

The Classification Scheme

Below is quoted the general areas of the "Movement Process Categories" of the Jewett and Mullan psychomotor domain with the permission of the American Alliance for Health, Physical Education and Recreation; and the authors. Note the ease of application of these processes to vocational education skills.

A. Generic Movement: Those movement operations or processes which facilitate the development of characteristic and effective motor patterns. They are typically exploratory operations in which the learner receives or "takes in" data as he or she moves.

   1. Perceiving: Awareness of total body relationships and of self in motion. These awarenesses may be evidenced by body positions or motoric acts; they may be sensory in that the mover feels the equilibrium of body weight and the movement of limbs; or they may be evidenced cognitively through identification, recognition, or differentiation.

2. Patterning: Arrangement and use of body parts in successive and harmonious ways to achieve a movement pattern or skill. This process is dependent on recall and performance or a movement previously demonstrated or experienced.

B. Ordinative Movement: The processes of organizing, refining, and performing skillful movement. The processes involved are directed toward the organization of perceptual-motor abilities with a view to solving particular movement tasks or requirements.

1. Adapting: Modification of a patterned movement to meet externally imposed task demands. This would include modification of a particular movement to perform it under different conditions.

2. Refining: Acquisition of smooth, efficient control in performing a movement pattern or skill by mastery of spatial and temporal relations. This process deals with the achievement of precision in motor performance and habituation of performance under more complex conditions.

C. Creative Movement: Those motor performances which include the processes of inventing or creating movement which will serve the personal (individual) purposes of the learner. The processes employed are directed toward discovery, integration, abstraction, idealization, emotional objectification and composition.

1. Varying: Invention or construction or personally unique options in motor performance. These options are limited to different ways of performing specific movement; they are of an immediate situational nature and lack any predetermined movement behavior which has been externally imposed on the mover.

2. Improvising: Extemporaneous origination or initiation of personally novel movement or combination of movement. The processes involved may be stimulated by a situation externally structured, although conscious planning on the part of the performer is not usually required.

3. Composing: Combination of learned movement in personally unique motor designs or the invention of movement patterns new to the performer. The performer creates a motor response in terms of a personal interpretation of the movement situation.

Conclusion

The use of the taxonomies as aids to vocational evaluation are critical. If one teaches at one level and tests or evaluates at another, then the student is being abused. Further, the type of evaluation being used should reflect a scope and sequence of skills which are hierarchically arranged. Thus, vocational educators do have a theoretical framework on which "to hang" their objectives. Our next chapter will address the concept of evaluation

models so that the process may be viewed from even a greater perspective. Finally, we must caution that while the domains tend to be theoretically oriented, their applications can be universal in vocational education. For example, the current "brief enthusiasm" for accountability is almost totally inappropriate for vocational educators. While there is a very strong intellectual component in vocational education, that component is not the only component. Thus, the cognitive domain should receive equal attention with the affective and cognitive domains by vocational educators.

Employers desire persons who have good attitudes, who can work independently, who can get along with others, who show initiative and who can complete a job with pride.

Vocational educators have long known about the above traits. In most instances, the "affective" skills are taught to persons enrolled in vocational courses or programs. So we caution you--do not abandon the traditional stress on values and skills for the "ease and convenience" of cognitive test profiteers.

Now let us examine one set of those evaluation models.

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Chapter 3

SELECTING AN APPROPRIATE EVALUATION MODEL

The goal of all education, given adequate available resources, is to offer the highest quality program possible. If vocational administrators and teachers are to maximize the quality of their programs, they must collect credible information so that their decisions will also reflect well--in a qualitative sense. We now focus our attention on the selection of evaluation models by which vocational educators may assess their programs. The task which confronts the vocational education evaluator is to select from among the many available alternative models.

A REVIEW OF SIX MODELS

We have selected six well-known models for discussion. Examine each to observe their commonalities. With such analysis, you can produce your own eclectic model. The six models which will be presented are:

1. Accreditation Model
2. Tylerian Model
3. CIPP Model
4. CSE Model
5. Formative and Summative Model
6. Single Subject Design Model

As you may recall, in Chapter 1 we stated that any conducted evaluation must ultimately lead to better decision-making. That common thread will be

woven throughout the six models. Evaluation should not be perceived as being a mechanism by which to fix blame or to be destructive. If any evaluation is to be helpful, it must be viewed as a formal process by which programs are improved through improved decision-making which is based upon objective data. Now, on to those models.

The Accreditation Model*

Accreditation represents the oldest type of evaluation activity. This model typically uses the role of the "expert observer." Emphasis is placed on the processes or means of education as opposed to consequences of educational activities on the learner. Procedures have been developed by such organizations as the American Vocational Association, National Council for the Accreditation of Teacher Education, and the North Central Association of Colleges and Secondary Schools. Accreditation reports are used to identify deficiencies in the education of students and their teachers and to withhold accreditation of programs or place embargoes on graduates if deficiencies are discovered and are not corrected. The variables examined in evaluating the programs typically include such criteria as those emphasized by the North Central Association:

1. The "general intellectual and moral tone" of the school
2. The school plant
3. Instructional equipment and supplies
4. The library and its services
5. Financial data and personnel records
6. Policies of the school board

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*The authors wish to thank Dr. William P. McDougall and Dr. James T. Shoemaker of the Department of Education of Washington State University for their generous assistance and permission to use some of their previously written materials about the Accreditation and Tylerian Models.

7. Organization and administration of the school
8. Teacher qualifications (degrees, subject matter preparation)
9. Teaching load
10. Whether the curriculum meets pupils' needs and interests
11. Guidance services
12. The school as educational and recreational center for the entire community

Implicit in this approach is the assumption that the quality of the facilities, the number of course units in the curriculum, and the number and kinds of courses taken by the teachers have a significant effect on the quality of vocational education.

High degrees of standardization have evolved in the development of our accreditation procedures and the utilization of systems describing such variables as training requirements, course units, plant facilities and finance. Little attention is paid to direct evidence of learner behavior. Gene V. Glass (1969) has observed that instructional outcomes are wedded to the faculty theory of psychology in vogue in the early 1900's. He noted that such theory is quite prevalent in our curricula. We would add that the "accountability" movement is equally as misguided. Such psychology persists in large part to this day as far as the traditional approach to accreditation is concerned, an assumption which is not now universally accepted but one which has gone unexamined in many accreditation practices. The Accreditation Model has borrowed little from the behavioral and social sciences.

Overtones of this model can quickly be recognized as having direct parallels in our traditional patterns of teacher certification. An accreditation visit embraces almost precisely the variables which are reflected in most standard certification patterns. These include the number of course units teachers have fulfilled, extent and reputation of the training institution,

degrees of faculty, and size of library. Little attention has been given to the direct assessment of learner behavior except as it is incorporated in standard course patterns.

A major weakness of the Accreditation Model is that standardization and wide acceptance of a process does not guarantee its effectiveness. Processes must be continually validated through experience and research as reflected in learner behavior. Counting and tabulating institutional artifacts may indeed be an exercise in futility if a direct link to learner outcomes is not present. Standards against which vocational education programs are evaluated cannot be totally arrived at through deliberation of experts on the subject but rather must depend, in part, on direct assessment of the performance of the learner. Other deficiencies were noted in Chapter 1.

The Accreditation Model is incorporated in most state education agency evaluations. Thus, we must address the model as one which will probably be around for some time.

The Tylerian Model

The Tylerian Model was originally devised as a curriculum evaluation model during the 1930's for the classic "Eight Year Study." The basic methodology was presented by Ralph W. Tyler and his associates (Smith and Tyler, 1942; Tyler, 1951) and has had broad application and influence in all areas of education.

Tyler's Model places almost exclusive priority on learner behaviors. It is the ends of instruction and not the means or processes which are important. The steps in the Tylerian Evaluation Model are to:

1. Formulate objectives. Determine the broad goals of the program.
2. Classify objectives. Develop a typology of objectives so an economy of thought and action may be achieved.
3. Define objectives in behavioral terms. This feature has become the cornerstone of the Tyler Model. "Modern" methodologies of evaluation

which rest heavily upon the specific, behavioral statement of objectives have not moved beyond Tyler's thoughts on evaluation in the Eight Year Study.

4. Suggest situations in which achievement of objectives will be shown.

5. Develop or select appraisal techniques (standardized tests, ad hoc tests, questionnaires.

6. Gather and interpret performance data. The final step in the evaluation process involves the measurement of student performance and the comparison of performance data with behaviorally stated objectives.

The Tyler Model has had pervasive influence on educational thought the past few years. It has served to help shift the focus of our thinking from process to product and to make explicit the need for clearly defined goals in terms of learner behaviors. Though direct learner influence is difficult to assess, it is probably the Tylerian Model which has encouraged educators to incorporate more current research from the social and behavioral sciences into the methodology of education. Tyler's efforts have lead to the model being utilized in packaged learning approaches, accountability by objective plans, as well as many federal program evaluation efforts. The key emphasis as it relates to the processes of vocational evaluation is the direct definition and assessment of learner behaviors.

Although the Tylerian point of view was initially creative, it has almost evolved into a mass (mess) of quickly written behavioral objectives. After years of experience with this model, there are unsolved problems which continue to reoccur. Four of those unsolved problems follow.

For a significantly large portion of vocational education curricula, the actual behaviors that are desired cannot be observed directly. Training and instructing must be evaluated through classroom tests, by observation in role playing situations or simulated exercises, and through the learner's written or spoken reactions. These behaviors do not fully represent real performance.

Behavior models and instrument development and validation are still at

primitive stages. Definition and measurement of most psychomotor behaviors constitute major stumbling blocks.

Research to establish desired behaviors for various vocational purposes is incomplete and, indeed, must be a continuous and evolving process.

The Tyler Model has been used now for nearly one-half a century. Despite the fact that it still has ardent defenders, it alone is inadequate as a model for evaluating outcomes of instruction and training. It is ill suited for evaluating problems of vocational organizational planning, facilities, and equipment, program rationale, or financing. It has and does make a significant contribution to educational thought in that it emphasizes the central importance of learner behavior/performance.

CIPP Model

The CIPP Evaluation Model was developed by Daniel L. Stufflebeam (1970, 1971) to provide a mechanism to improve both the intended types of decisions that were being made about programs as well as the actual decisions that were, in fact, made about programs. Stufflebeam perceives evaluation as having at least two major ends: (1) to determine the objectives, i.e., planning decisions and (2) to judge and react to what has actually taken place, i.e., recycled decisions. Further, the CIPP Model views as "means" the procedures by which decisions are implemented.

Thus, the CIPP Model is a means by which alternative decision-making to current practices is a basic component. To accomplish any evaluation, Stufflebeam suggests that evaluations be continual and systematic processes. To conduct the systematic evaluative processes, there are four major evaluation aspects: (1) context, (2) input, (3) process, and (4) product. You will note that these four concepts lead to the acronym of CIPP. Each of the components is used as a means leading to specific decision-making actions. Stufflebeam views the decision-making process as that which would modify,

adjust, sustain, or discontinue an educational program or any of its parts.

Context evaluation, according to Stufflebeam, is conducted where the activity takes place so that one may gather information concerning needs, problems and objectives. The context evaluation is a "reality" check.

Input evaluation is accomplished so that data may be gathered about strengths and weaknesses of alternative strategies which could also accomplish the program's objectives. Thus, context evaluation takes place to identify the best possible objective to accomplish a desired end. Input evaluation would then require judgments about relative strengths and weaknesses of the procedures which are used to implement the objectives.

Process evaluation is accomplished to obtain information about the exact strategies which are used to implement the procedures. By using process evaluation methods, one would determine the various techniques, strategies, and designs by which procedures are implemented in a program.

Product evaluation refers to an over-all decision-making process in which one would continue a project as is, modify the project and continue to use it, or terminate the project.

To use the CIPP Model, there are several issues which must be addressed. There is need for personnel who would determine the various specific aspects of each of these CIPP components. These persons would have to specify exactly what would be contained in the context, input, process, and product dimensions. Second, personnel would have to be identified to collect the data for each of the four areas. Finally, a series of standards would have to be developed by which the evaluation itself would be judged either meaningful or useless.

Figure 3-1 illustrates how the CIPP Model may be used as a decision-making model which stresses a project's objectives and methods in relation to decision-making.

	CONTEXT EVALUATION	INPUT EVALUATION
OBJECTIVE	To define the operating context, to identify and assess needs and opportunities in the context, and to diagnose problems underlying the needs and opportunities.	To identify and assess system capabilities, available input strategies, and designs for implementing the strategies.
METHOD	By describing the context; by comparing actual and intended inputs and outputs; by comparing probable and possible system performance; and by analyzing possible causes of discrepancies between actualities and intentions.	By describing and analyzing available human and material resources, solution strategies, and procedural designs for relevance, feasibility and economy in the course of action to be taken.
RELATION TO DECISION-MAKING IN THE CHANGE PROCESS	For deciding upon the setting to be served, the goals associated with meeting needs or using opportunities, and the objectives associated with solving problems, i.e., for planning needed changes.	For selecting sources of support, solution strategies, and procedural designs, i.e., for structuring change activities.

FIGURE 3-1: THE CIPP MODEL'S FOUR TYPES OF EVALUTION

Source: Daniel L. Stufflebeam, "Programmatic Change." A paper presented at the Annual Convention of the American Vocational Association, New Orleans, LA, December 5, 1970. Reproduced with the written permission of Daniel L. Stufflebeam.

	PROCESS EVALUATION	PRODUCT EVALUATION
OBJECTIVE	To identify or predict in process, defects in the procedural design or its implementation or to provide information for the pre-programmed decisions, and to maintain a record of procedural events and activities.	To relate outcome information to objectives and to context, input, and process information.
METHOD	By monitoring the activity's potential procedural barriers and remaining alert to unanticipated ones, by obtaining specified information for programmed decisions, and by describing the actual process.	By defining operationally and measuring criteria associated with the objectives, by comparing these measurements with predetermined standards or comparative bases, and by interpreting the outcomes in terms of recorded context, input, and process information.
RELATION TO DECISION-MAKING IN THE CHANGE PROCESS	For implementing and refining the program design and procedure, i.e., for effecting process control.	For deciding to continue, terminate, modify, or refocus a change activity, and for linking the activity to other major phases of the change process, i.e., for recycling change activities.

FIGURE 3-1, Continued: THE CIPP MODEL'S FOUR TYPES OF EVALUATION

Source: Daniel L. Stufflebeam, "Programmatic Change." A paper presented at the Annual Convention of the American Vocational Association, New Orleans, LA, December 5, 1970. Reproduced with the written permission of Daniel L. Stufflebeam.

Stufflebeam views evaluation much as we do--that is, proactive. Proactive means that the evaluation is conducted so that it may provide information concerning decision-making all along a project's route. The CIPP Model is not a model which can be used simply as a final evaluation technique. Finally, the CIPP Model is oriented to the users.

Further, the model could help school programs to be more credible to outside agencies which fund vocational education. For example, if one were to conduct a project sponsored under a grant from the Research Coordinating Unit of the Washington State Commission for Vocational Education then the CIPP Model could be used to show what took place during the entire duration of the project. To be sure, there would be several technical components of the CIPP Model. These would include the identification of what exactly was going to be evaluated, the kind of evaluation instruments that you would use, your sampling and data gathering techniques and your methods of analysis.

There is a major problem involved when using the CIPP Model: It uses a very complex methodology. It also tends to over-value the efficiency of educational processes and to under-value student goals and aims. However, the CIPP Model is one that could use either inside staff evaluators or outside educational auditors. The strength of the model lies in its continued focus on evaluation for decision-making.

The CSE Model

Marvin C. Alkin, Director of the Center of the Study of Evaluation at UCLA has suggested a rather eclectic evaluation model (1970). The basic principle of the CSE Model is that evaluation is a continuing process which aids decision-makers to select better among alternatives. (The latter element seems to be a universal.) Yet, it should be noted that to select among alternatives means just that. Evaluation must be viewed, argues Alkin, as a means

by which directions might be changed, programs modified or eliminated and personnel changed as need be. In most cases, vocational evaluators do not use evaluation to specify alternative directions. The identification of such alternatives, then, becomes a function of the evaluator.

CSE elements. Alkin (1970) identified five evaluation requirements and their concomitant decision areas. The five couplets, if you will, are:

Decisions	Evaluations
1. Selection of Objectives or Problems	Needs Assessment
2. Programs to meet Objectives	Plans
3. Program Operations	Implementation
4. Program Improvement	Progress
5. Program Certification	Outcome

It may be noted that these elements are similar to many of those already discussed. Alkin stresses that each of the five couplet areas (couplet is our term) requires collection of information, an evaluation of that information or data, and finally a decision based on the information. In all steps the evaluator must realize that the judgments are based only on a probability of success.

When one judges a vocational program, the first two element-couplets would be most critical, i.e., objectives-needs assessments and program plans. However, the judging of instructional components of the vocational program would rely chiefly on the last three element-couplets, i.e., operations-implementations, improvement-progress, and certification-outcome.

One point remains foremost in the CSE Model: The emphasis is always on improved decision-making capabilities of the persons who are directly affected by or who have effect on the vocational programs by continuous data collections. In short, the process is never ending.

Formative and Summative Evaluation

A basic objective of any evaluation system is to determine the extent to which the project objectives are being achieved and the impact that the project is having on the participants. To accomplish this evaluation objective, two additional evaluation methodologies are offered for use to vocational educators: (1) formative, and (2) summative. None other than Benjamin S. Bloom (1968 and 1971) and others have suggested this mode. Let us examine its components.

Formative evaluation. Formative evaluation is designed to provide feedback in a rather immediate sense. Formative instruments are specifically designed to monitor aspects of any program to determine where problems are emerging. By using formative evaluation, problems will be quickly identified and rectified. For example, if some methodology is being used which causes the students to do poorly, it will be through formative evaluation that trouble-shooting may take place. Often teachers give assignments but do not check the students' work until the conclusion of the project--which is too late. By continually checking the "small steps," vocational teachers might identify potentially detrimental learning or even instructional problems. Evaluators should initiate formative evaluation techniques so that they can observe many different perspectives of the program or course while it is actually in operation.

Only a few selected items need to be checked at any one formative evaluation. These would all be based on the stated learning or project objectives. One doesn't need a lengthy listing of items. The important point is that the feedback is collected while there is adequate time to make adjustments to the detailed project plans.

The rationale for formative evaluation is to provide data on which to make correctives--immediately, if not sooner! When students and program

staff members alike realize that they are being constantly monitored and helped, they tend to become more responsible and become more productive. The instructional climate and total program environment become positive and supportive. That is precisely the kind of learning climate that one ought to always subscribe when directing vocational classes. Conversely, vocational research projects have "gone on the rocks" because the project director was not evaluating project activities over short periods of time but waited until the very end of the project to accomplish a one-shot final evaluation.

Using formative evaluation is much more subtle than simply specifying performance objectives. Formative evaluation requires that the vocational project director carefully observe a selected set of experiences for all participants. For example, in most vocational programs, some form of laboratory activity is used to build a cluster of generic skills for future use. A person subscribing to formative evaluation would monitor the skills and, when a student did poorly, would provide a new set of experiences. To correct any noted learning deficiency, one cannot wait to take the "final exam." Correctives are an integral part of the formative evaluation plan.

For example, one simple method by which to record formative data is to tabulate the absolute numbers or percentages of both individual or group activities. A project director could compare group data on a graph so that the directions of the groups could be visually displayed for instant analysis.

The essential characteristic of formative evaluation is that "hard data" are being collected so that they may add a more "objective" evaluation of what is usually considered as "soft data" or the subjective elements of evaluation. But, more importantly, corrections are built into the scheme, so that feedback is used when it is needed most--not stored for the future.

Summative evaluation. That evaluation which is conducted as the final or concluding task is called summative evaluation. We should note that summative

evaluation might be the final formative evaluation of a course or project. Summative evaluations may take several forms, just so that they are consistent with the prescribed objectives of the program, course or module. Again, summative data could be tabulated into absolute responses and then as a percentage for each item. Comparisons between students could also be made on summative data (but not on the formative measures). The final grade is, of course, determined by the summative evaluations--N.B., plural--evaluations. One does not have one summative evaluation. These evaluations are placed at logical points in the program or project, such as at the ends of units, chapters, modules or learning activity packages.

The summative sets could then be arranged in a profile to illustrate the sum of evaluation activities. Formative data would provide feedback; while the summative scores would lead to "grades" or "judgments" about the quality of the performances.

Most projects fail because evaluation is a one-shot, post-evaluation. Such an evaluation strategy can never aid a project. It's too late, for the project is over.

Of course, it may be argued that formative and summative techniques will cause the direction of the project to change. Why, yes, we agree; and we would submit that if properly used, the objectives of the project might even be altered.

Success is the underlying tenet of this technique. If a program, course or project needs to be modified because of unrealistic expectations (objectives), then why not alter it?

Perhaps the most compelling reason in support of the formative and summative model is that there are really no "surprises" at the end of the project. With early feedback systems being built into the system, all elements should converge on success.

Single Subject Design Model

Although the emphasis in vocational education is usually on the use of groups as participants, there has emerged a rather new evaluation technique, commonly called "single subject design." This technique is most closely associated with contingency management or behavior modification techniques. Its popularity stems from the rationale that an individual provides both a control and experimental basis, depending on the criterion of intervention. Rather simply explained, the process contains at least five major steps.

The initial step is to determine some "inappropriate" behavior that the subject demonstrates or perhaps determine some behavior that you deem appropriate which the subject lacks. The second step is to actually count the times that the inappropriate behavior or action is shown by the subject. This is called establishing a rate count or establishing the baseline (number of responses divided by time). See Figure 3-2 for an example.

The third step is to intervene with some specific act which may cause the subject to accelerate or decelerate the initially described behavior or action. Rate counts are maintained during all phases. If the new behavior changes in the direction desired away from the baseline, then you may have found the correct "reinforcer" or intervening variable.

The unique aspect of this design is not to stop at step three but to add step four--revision back to the conditions as they existed initially. Such a reversal should then cause the subject to revert to the original behavior or action and to show a rate count approximating the baseline. If one observes that the desired direction continues even after the intervening variable has been withdrawn, then learning can be assumed to have taken place with a very powerful reinforcer or extinguisher. An inference could be made that the subject is now, to use a nonbehavioral term, a "self-actualizer."

Reintroduction of the intervening variable used in step three is often

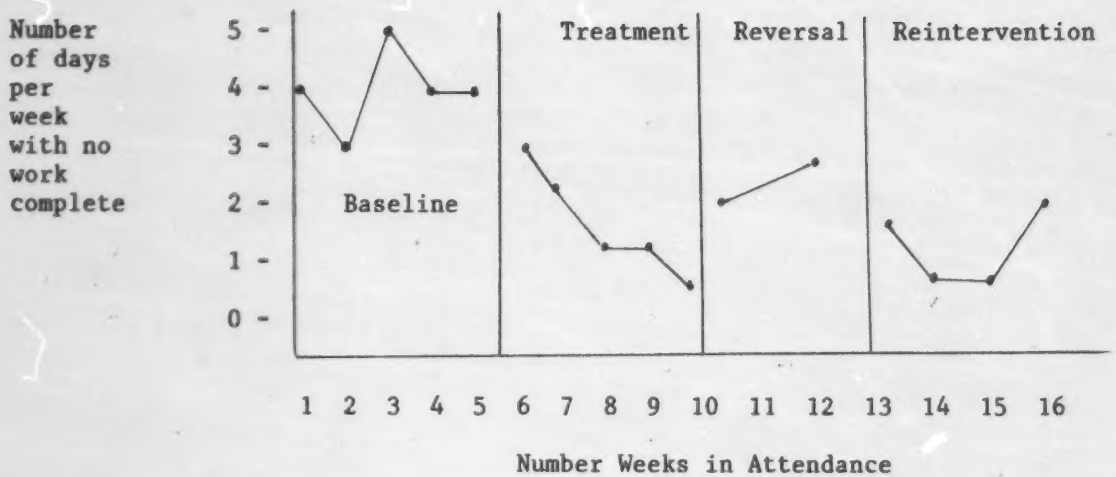

Figure 3-2. Typical Chart Illustrating Student "Turning in Work" Behaviors During Four Phases of Behavior Modification Paradigm using Single Subject Design.

the final experimentor action. If the appropriate action or reinforcer has been determined, then the subject will once again exhibit behavior and a rate count similar to that during the third phase of this process.

By using single subject design you can use small numbers of individuals to act as intact "groups" for control and experimental phases, respectively, for your study. This design allows for easy replication or duplication, which in large group projects is both difficult to accomplish and costly to conduct.

For more information and numerous reports refer to the Journal of Applied Behavioral Analysis which publishes, almost exclusively, single subject design studies.

In Conclusion

The above may all sound overpowering to the novice who has a "good idea" about evaluation. But remember, ideas are not implemented--the procedures are! Collectively, the evaluation procedures and learning objectives must support each other. This does not mean that your creativity is being curbed. It simply means that your creative efforts must be logically and systematically developed so that the ideas can be evaluated. We speculate that with PL 94-142 many more single subject evaluation designs will emerge in vocational education.

We have attempted to present a selected yet wide array of evaluation (decision-making) models which have relevance for vocational educators. The implied emphases are on systematic evaluation models, rather than a crisis or "hit-n-miss" evaluation. As vocational directors or teachers you must make the value-judgment as to what you'll evaluate and how. The above models are somewhat complex, but they will measure or judge selected performances. Yet, Julian Stanley (1954) cites a reference to an early evaluation technique which occurred in the Bible (King James Version, 12:5-6) taken from the Book of Judges.

> And the Gileadites took the passages of Jordan before the Ephraimites: and it was so, that when those Ephraimites which were escaped said, Let me go over; that the men of Gilead said unto him, Art thou an Ephraimite? If he said, Nay, then said they unto him, Say now Shibboleth: and he said Sibboleth: for he could not frame to pronounce it right. Then they took him, and slew him at the passages of Jordan: and there fell at that time of the Ephraimites forty and two thousand.

It may be noted that the foregoing evaluation was simple and crude, but it did require one to display the "critical performance."

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CHAPTER 4

PROCEDURES TO DEVISE AN EVALUATION SYSTEM

There is a need when devising or designing an evaluation system to develop a comprehensive perspective within which specific procedures may be conducted. This chapter is designed to accomplish that perspective, in part, by assisting vocational evaluators in identifying sources of evidence associated with data collection and by identifying a number of procedures that might be followed.

DESIGNING A COMPREHENSIVE EVALUATION SYSTEM

According to Scarvia B. Anderson and Samuel Ball (1978), vocational educators tend to use one of four designs when collecting evaluative data: (1) surveys, (2) student or teachers assessments, (3) quasiexperimental designs, and (4) experimental designs. As these four types are so widely used, Figure 4-1 was prepared to illustrate a matrix of selected sources of evidence which are available to the vocational educator. To plan an appropriate data-collecting system there may be additional requirements for additional characteristics other than those listed in Figure 4-1. If that is your specific case, then the feat to modify is easily accomplished by constructing a matrix similar to that in Figure 4-1 but by simply adding the additional problems or variables which have been identified as locally needed.

Initial Tasks in Designing an Evaluation System

When designing an evaluation system for the first time which is more comprehensive than "ad hoc," there are several tasks which need to be done prior to collecting any data. The first task is to write the objectives

for the evaluation system. After writing the objectives, you should prepare a set of policies and procedures which are convergent with the stated evaluation objectives. Finally, you should identify the audience for whom the evaluation results will be disseminated and used. The initial evaluation design should identify one of the evaluation models which might be appropriate to the local situation. For example, we discussed the CIPP, Tylerian and other models in Chapter 3. You may wish to synthesize from some of the various components of the models to generate your own eclectic evaluation model.

Using evaluation questions. Once the above have been accomplished, it then becomes an easy task to identify the specific evaluation activities to which the evaluation system will be addressed. Typically, evaluators prepare a list of written questions to aid in the preparation of the specific evaluation objectives.

The following is a very short list, a sample of the typical kinds of questions that vocational educators often address when designing an evaluation system.

1. To what extent did graduates in the Automotive Technology program achieve the course and program objectives?

2. To what extent is the training equipment in the Electronic program obsolete?

3. To what extent are the objectives of the Wood Technology program convergent with those which are needed to work successfully in the field?

4. To what extent do we need to extend the professional competence of our instructional staff in the Health Care program?

5. What percent of the vocational education program graduates are being employed in their related trades, industries and areas in which they were trained?

The above are examples of the kinds of evaluation questions that would be appropriate to further investigation through an evaluation system. Then, of course, one would simply collect data to determine the answers to the above questions. In this regard, the matrix as shown in Figure 4-1 could be slightly modified so that the sources of information to be used would lead to the current state-of-the-art of those questions.

Using the table of specifications. Table 4-1 illustrates the use of a table of specifications when one uses any of the prototype models for curriculum evaluation. Note that we identified only five models in the table. There are seven different components identified which would be addressed in the table. We just completed the specifications for Model 1, "School Accreditation." You could complete the grid as necessary for your own particular evaluation needs.

There are several additional models following Figure 4-1 and Table 4-1. These could be used for the tabulation of specific elements or bits of data that would help to make better judgments about your vocational education program. Our rationale for including Figure 4-1, Table 4-1, and Models 4-1 through 4-4 is to provide a graphic portrayal of how the various elements or components may be displayed. Discussing what kinds of data ought to be collected is simple. By showing how the information will be displayed, evaluators may reconsider their earlier decisions about what information is needed, how it will be displayed, and, ultimately, how it will be used

All of the illustrations are designed so that they may be easily adapted to meet your local situation. We encourage you to "cut-and-paste" these models so that they may be adapted to the specific evaluation system of your choice.

Investigative Techniques and Problems	Suggested Sources of Information							
	Test Scores	Questionnaire Data or Interview	Logs or Diaries	Observations	Rating Scales	Clinical Examinations	Records	Expert Opinion
I. Surveys								
Opinions about programs and Program delivery systems		X						
Human power needs projections		X					X	X
Program characteristics		X	X	X			X	
II. Student/teacher assessment								
Profiles of prospective, entering, and leaving students	X	X			X	X	X	
Characteristics of educational staff	X	X			X		X	
III. Quasi-experimental studies								
Student performance through changes of time	X			X	X	X		
Student performance for different program components	X			X	X	X		
Prediction of student success--exposed--not exposed to program	X				X		X	
IV. Experimental studies								
Difference in performance of students in program and students not in program	X			X	X	X		
Difference in students exposed to program variations	X			X	X	X		
Different program effects with students of specified characteristics	X			X	X	X	X	

Figure 4-1. Matrix to Determine Evaluative Data Needs

TABLE 4-1*

TABLE OF SPECIFICATIONS FOR
PROTOTYPES OF CURRICULUM EVALUATION

MODEL	KEY EMPHASIS	KEY USE	KEY ACTIVITIES	OUTSIDE EXPERTS NEEDED
1. School Accreditation	staff self-study	review and content procedures of instruction	discussion & professional judgments	none - unless other professionals
2. Tylerian Model Ralph W. Tyler				
3. CIPP Daniel L. Stufflebeam				
4. CSE Marvin C. Alkin				
5. Formative and Summative Benjamin S. Bloom, et al				

*Source: Alberta Hill, et al, Curriculum for Graduate Program to Prepare Vocational Education Curriculum Specialists. Pullman, WA, Washington State University, DHEW Grant No. DEC O-74-9287, 1976.

TABLE 4-1, CONTINUED

TABLE OF SPECIFICATIONS FOR
PROTOTYPES OF CURRICULUM EVALUATION

MODEL	TEACHING STAFF INVOLVEMENT	RISKS	APPLICATION
1. School Accreditation	high involvement essential, evaluation based on staff impact	subjective, extensive, time involvement of staff	involves staff in leadership and program/instructional evaluation
2. Tylerian Model Ralph W. Tyler			
3. CIPP Daniel L. Stufflebeam			
4. CSE Marvin C. Alkin			
5. Formative and Summative Benjamin S. Bloom, et al			

MODEL 4-1

EVALUATION PROJECT TASK ASSIGNMENT
AND CHECK FORM

Project _____ Date _____

Page _____

Title _____

What needs to be done?	Who is to do it?	To be done by what date?	Was it done?

Model 4-1 illustrates an easy form to assign staff evaluation tasks. This procedure can provide positive feedback to the evaluation staff when the tasks are completed. On the other hand, using the above form identifies those who didn't get their tasks completed during the specified time. Exactly how this check form is used may vary depending upon the number of persons involved in the investigation, the variety of tasks and sub-tasks, and the ability of individuals on the evaluation team do their job independent of supervision.

MODEL 4-2

INDIVIDUAL REPORTING FORM

GROUP _____ PROJECT TITLE _____

WEEK _____

DATE	TIMES	TOTAL HOURS	WHAT YOU DID	WHO YOU WORKED WITH	COMMENTS
SAT.					
SUN.					
MON.					
TUES.					
WED.					
THURS.					
FRI.					

Model 4-2 illustrates a time reporting form that could be used to collect primary data for a project evaluation where the time spent on a vocational activity was important to evaluation.

MODEL 4-3

PROJECT DIRECTORS ACTIVITY EVALUATION

PROJECT DIRECTOR _____ PROJECT _____

DAY	DATE	STRUCTURED ACTIVITY	LOCATION	NATURE OF PARTICIPATION
MON.				
TUES.				
WED.				
THURS.				
FRI.				

Model 4-3 could be used as an "ethnographic" grid to determine the interactions which take place in a highly personal or interactive project; such as follow-ups or job placement activities.

MODEL 4-4

EVALUATION INFORMATION CHART

PROJECT _____

DESIRED INFORMATION	DATA COLLECTION PROCEDURE		
	TYPE OF INSTRUMENT	DATES	PERSON RESPONSIBLE

DATA TREATMENTS			
STUDENT DATA	TEACHER DATA	DIRECTOR	DISPOSITION

Model 4-4 shows how an evaluator could collect data from various sources and then determine how the data would be disposed, i.e., forwarded for use.

Program, Course or Module Evaluative Criteria

Your authors have elected to combine the discussion of course and program evaluation because many secondary and post-secondary vocational programs and courses have similar components. The components that contribute to the effectiveness of the program or course are the administrative organization, the teaching staff, course or program objectives, testing (performance and/or written), content, teaching strategies, students, resources, guidance (career counseling, placement and follow-up). The degree to which each of these components is considered may vary according to whether one is addressing one course or a comprehensive program. The scope of the evaluation of a program or course ought to be based directly on the interrelationships of the components or course characteristics.

For example, Tim L. Wentling and Tom E. Lawson (1975) illustrate the interrelationship of course and program evaluations to student evaluation. They use the following seven tasks to determine those interrelationships:

1. Monitor student achievement
2. Guide student careers
3. Classify and place the students in the program
4. Evaluate programs
5. Improve the instruction and hypothesis testing
6. Improve the curriculum
7. Assess teaching effectiveness

Wentling and Lawson also listed ways in which evaluation data can be effectively used. For example, data and information can aid in facilitating the vocational program administrators as they talk to parents about students' progress and in preparing recommendations for their graduates as they seek jobs or seek further education. When student progress is monitored, vocational educators can review records of their learner's performance to see if

certain areas of their instruction have been covered. More importantly, however, student progress is monitored to share information and data with students to receive feedback. Students need, like, and want recognition for their achievements.

The following example of an evaluation methodology (Model 4-5) is taken from a curriculum guide for instructor training of medical laboratory aids. Observe how specific terminal behaviors provide a clear understanding of what students should be able to accomplish and what students should not be expected to do. A maximum latitude allows the instructor to develop learning activities and various teaching methods for students. This, in short, is the essence of criterion evaluation--judging the student by already existing standards.

Model 4-6 illustrates how a specific performance objective can be accomplished on an independent study basis. Evaluation is based on satisfactory completion of a grid similar to Table 4-1.

We conclude our models with another set of specific module or unit objectives. Model 4-7 is from a federally funded vocational education project.*

Observe how each content outline has an accompanying set of activities and resources which allows an individual to move at one's own pace. Concomitantly, it requires that all needed study materials and work stations be readily available and easily accessable.

---

*Vocational Education Curriculum Specialist VECS. "Module 7: Derivation and Specification of Instructional Objectives" by American Institutes for Research, Palo. Alto, California, 1976. Contract No. OEC-0-74-9286 from the U.S. Office of Education under Part I--Curriculum Development in Vocational and Technical Education, Vocational Education Amendments of 1968, Public Law 90-576, pp. 9-10. James A. Dunny, editor.

MODEL 4-5, STUDENT CRITERIA

SUBJECT: LABORATORY SAFETY: Dangerous Substances I.D. Number _____

RATIONALE: The necessity for proper handling of dangerous substances should be carefully emphasized to the laboratory aide, who may come in contact with such substances when ordering or storing supplies, preparing reagents, or handling specimens.

BEHAVIORAL OBJECTIVES: In any real or simulated situation, the laboratory aide will be able to describe or demonstrate the proper handling and storage of potentially dangerous substances such as acids, bases, flammables, mercury, poisons, and biological specimens of any type.

PREREQUISITE OBJECTIVES: D-3a

ABILITIES	RESOURCES
To achieve the objective, the student should be able to:	
a. lift and manipulate gallon-size bottles of caustic liquids safely without spillage or breakage,	
b. recognize the symptoms of chemical exposure,	
c. describe the use of antidotes,	
d. recognize the infectious hazards of clinical specimens,	
e. recognize specimens of extreme danger, e.g., icteric specimens and those labeled "isolation,"	
f. identify types of laboratory poisonings, their proper labeling and handling,	
g. describe the unique characteristics of mercury, its hazard and proper handling,	
h. identify hazard labels found in the clinical laboratory,	
i. identify laboratory liquids which are flammable, describe proper methods of storage and labeling,	
j. identify strong acid and base solutions, describe potential for hazardous fumes, proper labeling, handling, and storage,	
k. report laboratory injuries and accidents to supervisor.	

Source: State of Washington. Secondary Curriculum Guide for Medical Laboratory Aids. Superintendent of Public Instruction in cooperation with the Commission for Vocational Education. Olympia: January 1976, pp. 49-51.

MODEL 4-6, INDEPENDENT STUDY MODEL

PERFORMANCE OBJECTIVE

Explain the key salient features and usage of evaluation models having relevance for vocational education.

Instructional Objective

The learner will be able to describe the usage and emphasis of four evaluation models.

Learning Activity

Consult the list of references and complete the "Grid on Prototypes of Curriculum Evaluation."

References:

Bloom, B.S., Hastings, J.T., and Madans, G.H. Handbook on Formative and Summative Evaluation of Student Learning. New York: McGraw Hill, Inc., 1971. Chapters 2, 4 and 6.

Popham, James W. Educational Evaluation. Englewood Cliffs, N.J.: Prentice Hall Inc., 1975. Chapter 2.

Taba, Hilda. Teaching Strategies and Cognitive Functioning in Elementary School Children. Cooperative Research Project No. 2404. San Francisco, CA: San Francisco State College, 1966.

Wellman, Frank E. "Systems Model for Guidance Program Development and Evaluation," Pupil Personnel: A Handbook for Program Development and Evaluation. Columbia, MO: University of Missouri, 1971.

Model 4-6 is adapted from: Alberta Hill, et al, Curriculum for Graduate Program to Prepare Vocational Education Curriculum Specialist, "Organizing Instructioanl Strategies," Department of Education, Washington State University, Pullman, WA 99164. Grant No. DEC 0-74-9287, 1976.

MODEL 4-7, MODULE EVALUATIVE CRITERIA

PART II

CONTENT AND STUDY ACTIVITIES

Goal 7.1

CONTENT OUTLINE	ACTIVITIES-RESOURCES
Goal 7.1: Perform the Necessary Preparatory Steps for Systematic Derivation of Instructional Objectives.	
A. Job Description	
1. Vocational instruction is keyed to occupations and jobs. Therefore, instructional objectives must also be derived from jobs.	(26) Individualizing Vocational and Technical Instruction, Chap. 4.
2. In order to determine the instructional objectives that a student should achieve to ensure successful performance on the job, it is first necessary to define the job clearly (26).	(5) Instructional Systems Development for Vocational and Technical Training pp. 73-74.
3. A general job description provides the basis for a detailed task analysis which, in turn, provides the basis for the development of instructional materials.	(12) Occupational Analysis, Techniques and Procedures, pp. 33-37.
4. Job descriptions vary in format format according to the source. However, the usual components are:	*See Classroom Activity 1 in Part III.
a. location and general working conditions; b. a general statement of job functions and relationship; c. general duties; d. possible contingent responsibilities; e. simply stated job tasks (5), (12).	*See Discussion Question A in Part III.
B. Task Analysis	
1. A task analysis is the basis for vocational instruction. The process involves starting with the basic job and breaking it down into successively more detailed components or levels. The purpose of the process is to obtain an adequate	

CONTENT OUTLINE (Cont.)	ACTIVITIES-RESOURCES
definition of the job so that effective instructional objectives and learning activities can be devised to teach the occupation to a willing student.*	*See Discussion Question B in Part III.
2. The curriculum specialist must be trained to recognize the least detailed level to which a task analysis should be taken so that effective instruction will result and unnecessary task detailing avoided. The curriculum specialist's perception of community needs, and his or her estimation of the capabilities of the staff to design the necessary instruction, will likely be the primary facotrs in other decisions. the primary factors in other decisions. factors in other decision.	(22) Developing Vocational Instruction Chap. 3, describes a a system of task analysis designed for the practicing curriculum specialist. See also: (26) Individualizing Vocational and Technical Instruction, Chap. 4. 4. See also: (23) Procedures for Constructing and Using Task Inventories. See also: (12) Occupational Analysis Techniques and
3. Many systems exist for performing a task analysis--from simple ones to sophisticated and extremely complex ones. The The curriculum specialist will probably find a system between the two extremes to be most useful (22).	
4. A first step in performing a task analysis is to locate any existing task analyses for the occupation under consideration. This involves searching publications, indexes, catalogs, and other references. Possible sources for task analyses include (23).**	**(23) Procedures for Constructing and Using Task Inventories, Chap. 2.

Source: Vocational Education Curriculum Specialist VECS. "Module 7: Derivation and Specification of Instructional Objectives" by American Institutes for Research, Palo Alto, California. 1976. Contract No. OEC-0-74-9286 from the U. S. Office of Education under Part I--Curriculum Development in Vocational and Technical Education, Vocational Educational Amendments of 1968, Public Law 90-576, pp. 9-10. James A. Dunny, editor.

Program Evaluation Review Technique (PERT)

One popular method by which planning for evaluation may be implemented is through the Program Evaluation and Review Technique (PERT). PERT is a method for planning diverse program activities, regardless of how they are coordinated, into manageable processes leading to the project's successful fruition. Note that the emphasis is on management. If a PERT network is established, there is an underlying assumption that there will be management concerns about planning; organizing; motivating; and controlling the fiscal, material and human resources so that their total interactions will be evaluated by a predetermined set of objectives.

The PERT system is an attempt to facilitate three common dimensions of managing the project--time, costs (or resources), and performances. Once a generally agreed upon set of evaluation goals has been identified, all goals and processes are sub-divided into very specific components and placed on a "work division structure." A work division structure identifies all of the components of every major unit. After major units have been identified, a network would then be prepared. Each network is composed of events and activities. Events are defined as those items which represent the start or completion of an activity but do not consume time, personnel, or resources. Activities are those tasks or jobs which require the utilization of personnel and resources over a period of time. The PERT network, then, is developed so that a timeline, management check, and cost analysis estimate, as well as output products, may be identified.

An outstanding source for PERT techniques is available from the United States Government Printing Office. That source is:

> Desmond L. Cook, Program Evaluation and Review Technique Applications in Education, U.S. Department of Health, Education, & Welfare, Office of Education, OE-12024, Cooperative Research Monograph #17, Superintendent's of Documents Catalog #FS-5.212:12024, U.S. Government Printing Office, Washington, D.C., 1966, paperback, 100 pp.

Desmond Cook's monograph presents in detail the application of PERT techniques to several different educational processes and serves as an invaluable resource.

Figures 4-2 and 4-3, which follow, illustrate a sample of PERT networks as they would be constructed to aid in the conduct of a survey, e.g., to follow-up graduates or the designing of a curriculum project.

The figures show the organization of the major elements which would be predetermined in the initial planning stage. The activities and events are then arranged in a logical and sequential order. The actual PERT chart shows the major elements. Further, the PERT chart shows the interrelationship of each element.

A PERT chart is constructed in several ways. We have found through experience that there are at least three major steps: (1) identifying elements, (2) clustering them and (3) sequencing them into the network.

Once you determine what you want to do (your objectives) and how you'll accomplish the project (procedures), you are then ready for step number one--identifying the elements or tasks. A modified "brain storm" technique is one easy way to accomplish this step. You simply identify every possible task or event that you think must be done.

Step two begins when these tasks or events are clustered about some general theme or concept. These logical orderings help to identify major clusters of related events or activities.

In the final step, sequencing, the clusters of events are combined to illustrate a methodical and linear arrangement of tasks, events, and activities from the beginning to end.

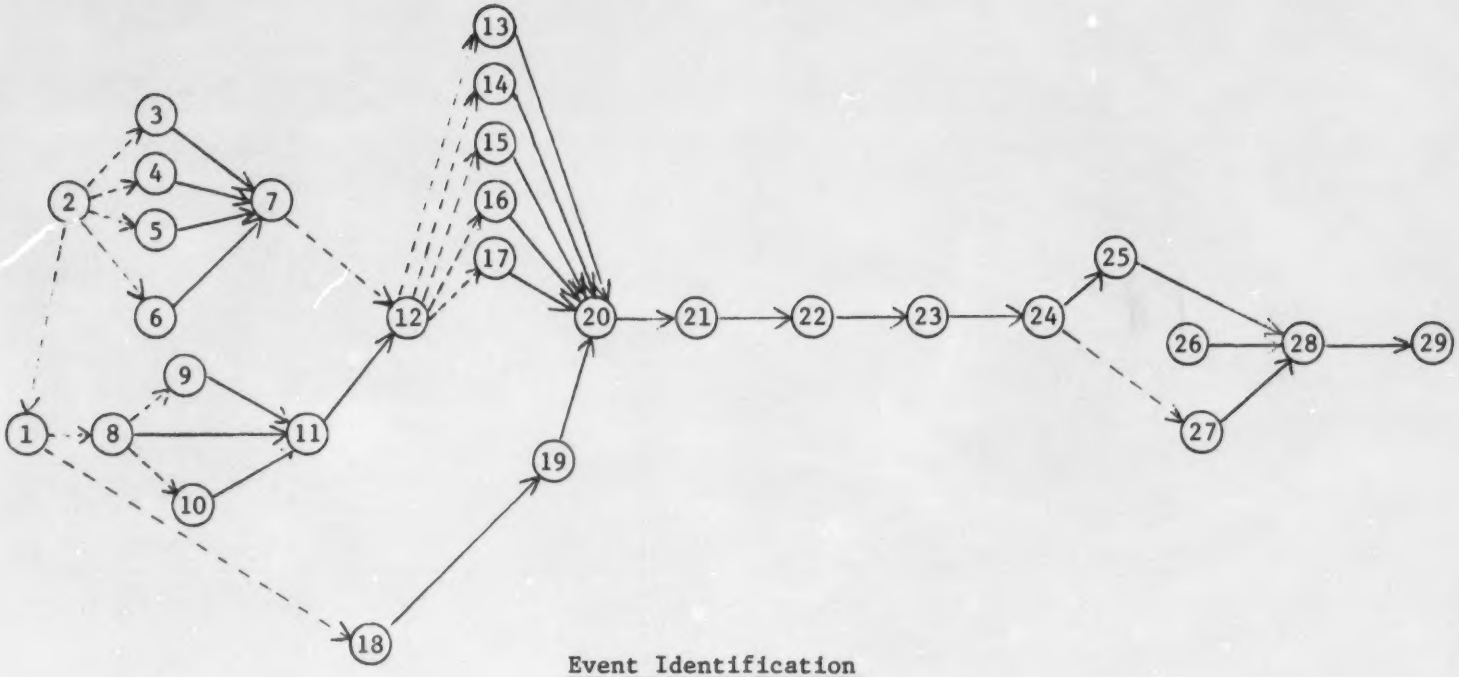
For example, in Figure 4-2 activities 3, 4, 5, 6 and 8 may all be initiated autonomously. None of these activities is totally dependent on any of the others. With such planning knowledge, a project director might wish to

assign specific responsibilities to various teams. The teams can develop reports which can be coordinated at event number 7. However, it would not be possible to begin event number 12 prior to completion of both events number 7 and 11.

By establishing a detailed PERT chart or network for each major element in which change is being planned, a visual schematic is made available of anticipated activities. PERT networks must always be considered as "best predictions." The interrelationships of all elements become known. Precision is then added to the project calendar by determining time and cost estimates on the chart. More importantly, critical areas are identified in advance of the event. Program directors can predict and prepare for anticipated contingencies or outcomes. However, as a project progresses, there will certainly be unanticipated events that require modification of the original network. Thus, there ought to be a continuous monitoring of project activities and personnel so that the PERT network resembles a reasonably accurate blueprint for action. Finally, a more efficient use of material and human resources will be the outcome of using a PERT network to describe the project.

One could even PERT a segment of an evaluation paradigm, for example, preparing a PERT network on the development of a district vocational achievement test. There would be at least nine sets of tasks to be sub-divided into specific activities and then assembled logically into the network. The tasks would be to: (1) establish the test's purpose, (2) employ item developers, (3) try out an initial form of the test, (4) revise the test, (5) norm the test, (6) prepare a test manual, (7) administer the test, (8) collect and analyze the data, and (9) prepare a final report about the results.

PERT and planning make for successful projects. Now on to Figures 4-2 and 4-3.

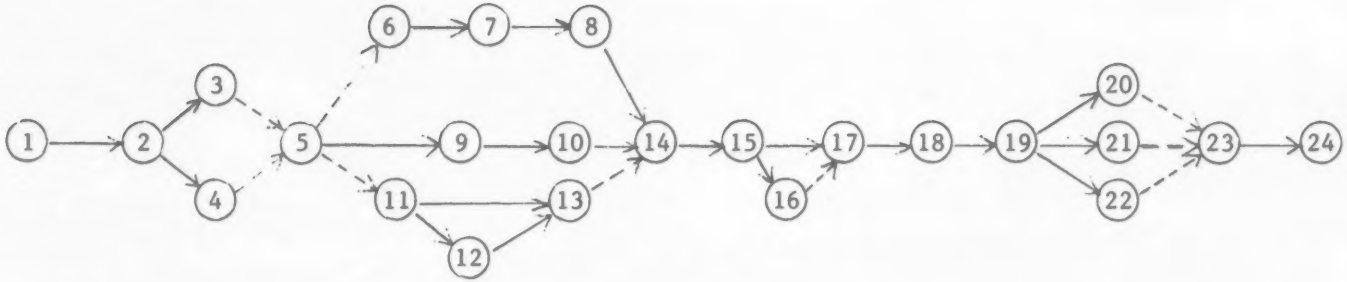


Event Identification

1. Project Start	11. Structure Complete	21. Start Tryout
2. Objective Start	12. Start Instructional Materials	22. Start Evaluation
3. Start Philosophical Evaluation	13. Start Teacher Manual	23. Start Final Materials
4. Start Psychological Evaluation	14. Start Student Material	24. Complete Final Materials
5. Start Content Evaluation	15. Start Audiovisual Aids	25. Start Publications
6. Start Measurement Evaluation	16. Start Evaluation	26. Start Teacher Orientation
7. Objectives Complete	17. Start Reference	27. Start Administration Orientation
8. Start Structure	18. Start Dissemination Procedure	28. Start Lay Orientation
9. Start Determination	19. Start School Sample	29. Project Complete
10. Start Evaluation	20. Start Material Distribution	

FIGURE 4-2. SUMMARY NETWORK FOR CURRICULUM PROJECT

Source: Desmond L. Cook. Program Evaluation and Review Technique Application in Education (Washington, D.C.: USGPO, U.S. Department of HEW, Office of Education, Cooperative Research Monograph No. 17) 1966, pp. 53, 54, 55. Public Domain Document.



Event Identification

1. Start Project	9. Start Tryout	17. Start Tabulation
2. Complete Objective	10. Start Final Form	18. Start Statistical Tests
3. Complete Data Paradigm	11. Start Interviewer Selection	19. Complete Tests
4. Complete Hypotheses	12. Complete Administrative Procedures	20. Complete Interpretation
5. Start Item Construction	13. Complete Schedules	21. Complete Tables
6. Start Universe Definition	14. Start Field Interview	22. Complete Charts
7. Start Sampling	15. Start Data Coding	23. Start Narrative
8. Start Sample Selection	16. Complete Follow-up	24. Complete Narrative

FIGURE 4-3. SUMMARY NETWORK FOR SURVEY RESEARCH PROJECT

Source: Desmond L. Cook. Program Evaluation and Reviwew Technique: Applications in Education, USD/HEW Office of Education, Cooperative Research Monograph No. 17, U.S. GPO, Washington, D.C.: 1966. Sources, Figures 30, 31 and 32, pp. 41-43. Public Domain Document.

Moral-Ethical Considerations

While it may not be in vogue to discuss the morality and ethics involved in evaluation, we would be remiss, nay, negligent if we didn't address the topic, at least in passing.

Henry M. Brickell (1976) published a rather shocking indictment of those being evaluated who attempt to influence the evaluators to distort the findings and subsequent reports. Brickell summed the various pressures he has faced as "external political factors." In the last analysis, we interpret Brickell as subtly suggesting "situation ethics" when being an evaluator. They are hiring you to do the job so don't probe too deeply.

The authors of this monograph have had widespread project evaluation experiences, and in at least two cases one of the authors had the rather difficult task of requesting that the respective projects be closed down. And, the political realities were not withstanding!

If an evaluator allows "external political forces" to influence the evaluation there are really only two decisions: (1) write the report objectively and let the "fur fly" or (2) resign from the evaluation team. The taxpayers, by and large, are supporting the projects. They deserve to have the stewardship of the public domain to be protected from unethical profiters and charletons. But, let us address the topic more fully.

On being ethical. It must be recognized that evaluations and evaluators tend to be "value-free." This means that preconceived judgments are not made, and that one attempts to collect data by which to make judgments. Yet, the judgments or evaluations are guided by a set of criteria. A trait is judged to be poor or outstanding by applying those criteria. The values of the evaluator might even be opposed to the values of the project. Yet, if the project has a set of criteria by which it is to be judged, then the evaluator has no other alternative than to use those criteria.

It must be understood, however, that the evaluator in such cases may file an addendum to the evaluation report which criticizes the criteria and may even offer a set of criteria which would be more germane to the objective.

Judgments are made by evaluators--that's what the process is all about. Yet, an evaluator can provide alternatives and suggestions that go beyond the specific project to help improve it. Evaluation is for decision-making. Thus, it behooves an evaluator to provide a wide array of suggestions, strategies for improvements and, if possible, predicted outcomes.

Finally, the organization or group being evaluated has the option of either accepting or rejecting the "advice."

An evaluator must view any evaluation as a task--neither as a personal confrontation, nor a personal favor.

IN FINAL CONCLUSION

Collectively, we have addressed a few concerns about evaluation. We have only presented a sample of the many different systems and models. It is essential to realize that all evaluation models arise from preselected criteria. To be sure, the criteria are subjective, but being subjective should not be confused with being arbitrary or dogmatic. Being subjective implies that there is a rationale which supports and generates the criteria. Several different evaluation methodologies--have been presented for your use. Each has a distinct set of criteria.

The major goal of this monograph is to provide busy vocational educators with models which may be either adopted directly or easily adapted for use. The ultimate import of our work is to improve the evaluation of vocational education at all levels.

REFERENCES

Anderson, Scarvia B. and Samuel Ball. The Profession and Practice of Program Evaluation, San Francisco, Jossey-Bass, 1978.

Brickell, Henry M. "The Influence of External Political Factors On the Role and Methodology of Evaluation." Evaluation Comment, Center for the Study of Evaluation, UCLA, December 1976, Vol. 5, No. 2.

Wentling, Tim L. and Tom E. Lawson. Evaluating Occupational Education and Training Programs, Boston: Allyn and Bacon, Inc., 1975.

INTRODUCTION TO THE APPENDICES

Selected Formates Which Illustrate Evaluation Devices

A number of evaluative areas and models in vocational education were introduced or implied in the previous chapters. The writers of this guide have compiled selected sample instruments, e.g., check lists, survey forms, attitude scales, interview schedules and assorted evaluation forms. These examples may be useful to the readers to assist in constructing their own materials for evaluation purposes. The writers have intended to provide a wide variety of evaluation formats that cut across all fields of vocational education. However, many of these materials can be adapted for specific use in an infinite number of situations.

To assist the reader, the selected sample formats represent the following categories or program evaluations: student assessment, teacher assessment follow-up, employee surveys and the general category of evaluation.

Each sample may not be presented in its entirety; however, references will allow the reader to gain access to the remaining materials from the listed sources. It is also hoped that the local vocational educators will be encouraged by these materials to think creatively and to adapt the material to their own fields. What matters primarily is not the specific content of the evaluation form but the approach and the point of view.

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APPENDIX A

IDEA SURVEY FORM--STUDENT REACTIONS TO INSTRUCTION AND COURSES

Form C

The following teacher evaluation form is being developed to evaluate vocational-technical courses by the Center for Faculty Evaluation and Development in Higher Education at Kansas State University. It is anticipated that it will be available on a fee for service basis in the Fall of 1979. The approach used by IDEA focuses upon the improvement of instruction. IDEA considers the intructor's course objectives as well as the size of the class and the students' desire to take the course. When students do not report satisfactory progress on the instructor's course objectives, teaching methods that might be improved are suggested. The items contained in this form were selected by over 100 instructors of vocational-technical courses at over 15 community colleges and area vocational-technical schools as being appropriate for their courses.

Appendix A is printed with the permission of the Center. The present Form C is a research version and is being copyrighted. Anyone wishing to use this form must contact:

Dr. William E. Cashin
Center for Faculty Evaluation and
Development in Higher Education
Kansas State University
1623 Anderson Avenue
Manhattan, KS 66502

IDEA SURVEY FORM--STUDENT REACTIONS TO INSTRUCTION AND COURSES
FORM C

To the Learner: Because this is part of a research study, the form has more questions than the final form will have. Please answer each question CAREFULLY. CHECK that the number you are marking on the response card is the SAME as the number of the question you are answe ıg.

Your HONEST answers to these questions will be helpful to your instructor who will receive back all of the response cards.

How often did your instructor do the things described below? Use the following code:
1 = Hardly Ever 3 = Sometimes 4 = Frequently
2 = Occasionally 5 = Almost Always

The Instructor:

1. Had prepared everything necessary fc- each class.
2. Let learners know what they were expected to learn.
3. Presented course content clearly.
4. Distinguished between facts and opinions.
5. Used examples from real-life or actual work.
6. Summarized in a way which helped learners remember.
7. Demonstrated the skills or procedures learners were required to learn.
8. Gave learners opportunity to practice skills or procedures.
9. Taught skills or procedures step-by-step.
10. Related what was being learned to on-the-job situations.
11. Fit the instruction to the differences in learners' knowledge or skill.
12. Used films, models, or other teaching aids that helped learners learn.
13. Used special teaching approaches (e.g., case studies, role playing, contract learning, etc.).
14. Provided help when the learners needed it.
15. Encouraged real discussions with learners (instead of just asking or answering questions).
16. Found ways to help learners answer their own questions.
17. Changed way of teaching if learners were not learning.
18. Gave learners reasons for their grades on tests, projects and other work.
19. Used up-to-date materials and equipment.
20. Was patient with learners.
21. Seemed to know when learner was having difficulty.
22. Respected the learners.
23. Showed an interest in the goals of the learners.
24. Was enthusiastic about what was being taught.
25. Made sure that learners understood directions, safety and health considerations for each task.
26. Made presentations which were interesting and held learners' attention.
27. Encouraged learners to find ways to improve their work.
28. Praised constructive criticisms of learners' performance.

29. Gave constructive criticisms of learners' performance.
30. Suggested what learners could do to improve.
31. Promptly returned learners' work to them.
32. Accurately evaluated the learners' performance.
33. Enforced the rules and regulations fairly.
34. Gave each learner a fair share of attention.
35. Pointed out common problems to learners before they began a task.
36. Provided active work experiences (e.g., hands-on) for the learners.
37. Used community resources, field trips, etc.
38. Taught in a well organized way.
39. Encouraged learners to speak freely and openly.

SKIP the spaces A through G on the response card. Start with question NUMBER 40.

On each of the possible objectives listed below, rate the progress you have made in this course or program compared with that you have made in other courses or programs you have taken at this school. If this is the only course or program you have taken here, compare your progress with that you have made in previous learning experiences. You are not expected to make progress on every objective in every course or program.

In this course or program my progress was:

1 = Low (lowest 10% of the courses or programs I have taken)
2 = Low Average (next 20% of the courses or programs)
3 = Average (middle 40% of the courses or programs)
4 = High Average (next 20% of the courses or programs)
5 = High (highest 10% of the courses or programs)

Progress on:

40. Learning factual knowledge, terms and concepts of the occupation.
41. Understanding the principles or reasons for various practices or procedures.
42. Knowing when and how to use different methods or procedures.
43. Correctly using the instruments and tools of the trade or occupation.
44. Developing the manual skills required in the occupation.
45. Learning to solve problems (diagnose, trouble-shoot, debug, etc.)
46. Developing the communications skills (reading, speaking, writing) needed for the occupation.
47. Developing the work habits (attendance, dress, safety, etc.) needed for the occupation.
48. Learning to meet the production demands of the occupation.
49. Learning the skills necessary to get a job (applying, preparing a resume, being interviewed, etc.)
50. Developing the attitudes desired of people in the occupation.
51. Learning to work with other people (e.g., co-workers, supervisors, etc.)
52. Developing a sense of personal responsibility (self-confidence, self-discipline, etc.).

53. Understanding myself, my strengths and weaknesses related to the field or occupation.

On the next six questions, compare this course or program with others at this institution (or with your previous learning experiences), using the following code:

1 = Much less than most courses or programs
2 = Less than most
3 = About average
4 = More than most
5 = Much more than most

The Course:

54. Amount of reading.
55. Amount of work in other (non-reading) assignments.
56. Difficulty of subject matter.
57. How well the course fit together (various topics and activities were related to each other).
58. Adequacy of physical and other facilities (space, lighting, equipment, tools, etc.).

Describe your attitudes toward and behavior in this course or program, using the following code:

1 = Definitely false
2 = More false than true
3 = In between
4 = More true than false
5 = Definitely true

Self-rating:

59. I worked harder on this course than on most courses I have taken.
60. Before enrolling, I really wanted to take this course.
61. I would like to take another course from this instructor.
62. Because of taking this course, I like this occupation better.

Your comments are invited on how the instructor might improve this course or teaching procedures. Use the back of the Response Card.

THANK YOU FOR YOUR HELP.

APPENDIX B

SAFETY EVALUATION

Safety is a major concern to anyone involved in vocational program operation. The set of criteria identified in the selected form can be easily applied to a variety of fields or disciplines of Vocational Education.

Source: Oregon State Department of Education
Community College & Career Education
Technical & Industrial Education, "Metals Cluster Curriculum"
February, 1974. This form has been modified to more readily
meet the needs of evaluators in all vocational programs.

Directions

The following sample instrument may be used by local vocational directors or teachers to assess the adequacy of their safety program. The scale, 4 3 2 1 0 if consistantly used can provide your vocational education staff with useful information across programs to establish safety standards within a given facility. A "4" would indicate the highest possible ranking for any item, while a "0" would indicate a most unsatisfactory rating.

ELEMENT - SAFETY

PHILOSOPHY

Safety education is an integral part of the vocational programs. All instructional personnel should be knowledgeable in the application of all Washington safety codes related to the vocational program. In order to insure safe working conditions, it is imperative that an adequate shop or lab safety program be established, including periodic inspections involving staff, students and qualified safety inspectors. The school district should accept the responsibility to organize and maintain a total school safety program and provide the necessary administrative leadership, in-service, and required safety materials and equipment.

ASSESSMENT CRITERIA:	ASSESSMENT	REMARK
1. There is a functioning shop safety program including periodic inspections involving staff, students and qualified safety inspectors.	4 3 2 1 0	
2. In-service is provided at regular intervals to insure that all instructors are kept up to date in all safety practices and policies.	4 3 2 1 0	
3. Adequate funding is available to provide the required materials and equipment to maintain a safe program.	4 3 2 1 0	
4. There is an established policy covering first-aid procedures.	4 3 2 1 0	
5. The shop program is an integral part of the total school safety program.	4 3 2 1 0	
6. School personnel are designated as safety officers with the specific responsibility to administrate the safety program, maintain all required records, and report all violations.	4 3 2 1 0	
7. The shop has an adequate ventilation stystem for the specific vocational program.	4 3 2 1 0	
8. Students are provided with eye protection equipment, and machines are guarded properly.	4 3 2 1 0	
9. The arrangement of the shop allows for a safe traffic pattern, as well as safety zones around machinery and equipment.	4 3 2 1 0	
AVERAGE TOTAL ASSESSMENT		

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APPENDIX C

YOUTH ORGANIZATION EVALUATION

Most educators would agree that ycuth organization are an integral part of the educational program. Much of the developing perceptual abilities of students and affirmation of attitude takes place where students affect the governance of themselves. The following instrument is provided to assess the youth organization aspect of the vocational education program.

Source: Oregon Department of Education,
"Assessment Manual for Program Planning
Model Electrical Cluster Guide,"
May 31, 1975.

The following sample instrument may be used to assess the youth organizations program whether, VICA, FF/, FHA, FBLA or DECA. The percents for each item in the performance standards section of the instrument is used to establish a norm for the entire instrument. These maximum percents are suggested amounts based on the experience of educators working extensively with youth groups. The vocational director or teacher evaluating a youth program can use the model range scale to determine how well their youth programs are achieving the performance standards.

YOUTH ORGANIZATION

Youth development should be an integral part of the vocational education program. This should include:

Personal growth--individual self-improvement through scholarship, citizenship, and participation in home, school, and community activities.

Community understanding--improvement of relations among students, between students and teachers, employees and employers, management and labor, school and community and other nations.

Safety--in shops, classrooms, on the job, and on the highway.

Teacher recruitment--the encouragement of capable students to enter the field of industrial education.

Vocational youth cooperation--among youth in all areas of vocational education.

Good public relations--promoting a general public awareness of the good work that youths engaged in vocational education are doing to better themselves, and their community, state, nation and world.

PERFORMANCE STANDARDS	ASSESSMENT
1. Is there a VICA Chapter in your school and how are students informed of its existence? (15%)	_____
2. Are majority of the students in VICA? (40%)	_____
3. Do students in local VICA Chapter participate in state and national VICA events (10%)	_____
4. Do VICA members participate in local business and community affairs? (10%)	_____
5. Does the school administration support VICA involvement through teacher release time and a minimum amount of financial assistance? (15%)	_____
6. Is the involvement in VICA an integral part of the vocational offering? (10%)	_____

ASSESSMENT SCALE

Model Range

0 20 40 60 80 100

APPENDIX D

GUIDANCE PROGRAM EVALUATION

Evaluation of a career and vocational guidance program is essential to vocational education. The authors have included these criteria in the following format so that they may be modified to fit local needs.

Source: "Health Occupations Cluster Program Assessment Instrument for Secondary Schools", Oregon Department of Education. December, 1977.

The following sample instrument may be used to assess guidance and counseling program at the local level. The percents for each item in the performance standard section of the instrument is used to establish a norm for the entire instrument. These maximum percents are given as suggested maxima based on experience of educators working extensively with career guidance.

The vocational director who evaluates the guidance and counseling program can use the model range scale to determine how well the school district's guidance and counseling program is meeting the needs of students.

ELEMENTS	PERFORMANCE STANDARDS

ELEMENT: GUIDANCE, COUNSELING, FOR VOCATIONAL CLUSTERS

A model vocational cluster should be structured so that assistance can be given each student in the achievement of the goals and objectives consistent with interests and abilities.

PERFORMANCE OBJECTIVES:

The vocational cluster faculty in cooperation with the guidance and counseling department has:

1. Provided occupational and career information which will enable students to assess their interests and aptitudes.

2. Developed and implemented a plan for student enrollment which will include: community needs, student interests, and occupational requirements as factors for consideration.

3. Encouraged students to develop a total career program by taking supporting courses appropriate to their career interests.

4. Provided facts concerning post-secondary educational programs and the competitive selection processes for those programs.

5. Developed and implemented a program to provide exploratory courses in the occupations for students in grades 7 through 10.

6. Developed a plan to make students in grades K-6 aware of the opportunities and rewards in business and industry.

1. Are counseling, guidance and other staff members responsible for advising students in the selection of courses and programs, informed about the vocational career areas and appropriate allied supporting courses? (20%) ____

2. Are students aware of the competitive nature of selection procedures in post-secondary education for specified vocational program? (20%) ____

3. Are students referred to the Vocational Cluster as a result of a demonstrated interest and the ability to meet occupational requirements? (20%) ____

4. Is student enrollment based on a plan that is justifiable in terms of a community needs? (20%) ____

5. Are exploratory experiences available in vocational education for students in grades 7-10? (10%) ____

6. Does a plan exist for vocational orientation for students K-6? (10%) ____

ASSESSMENT SCALE

0 20 40 60 80 100

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APPENDIX E

JOB PROGRESS EVALUATION

The final stages of most vocational education training programs have a cooperative work experience component. The success of this phase can be best measured if the employer, the supervisor and student are given opportunities to provide input.

The following sample forms are provided for the reader to identify appropriate content and sample format.

These samples were selected at random.

Source: Vocational Teacher Education Department
University of Idaho
Moscow, Idaho, 1976.

CRITERIA FOR SELECTION OF A

TRAINING STATION

A training station should be selected on the needs of the cooperative students, their career objectives, the community needs, and the standards of the employer.

2 points = to a great extent

1 point = to a limited extent

0 points = does not offer

To what extend does the training station offer:

_____1. interested and understanding employers

_____2. progressive attitude

_____3. safe and sanitary work conditions

_____4. good image

_____5. convenient location

_____6. varied learning experience

_____7. opportunity for advancement and promotion

_____8. provide a minimum of 540 working hours per year

_____9. wages paid to other employees in the same position

_____ TOTAL

COOPERATIVE EDUCATION
JOB PROGRESS REPORT
_____ HIGH SCHOOL

TO THE EMPLOYER: This report is your estimate of this student-trainee's work activity. Please check the chart in the columns which most accurately describe this particular student.

_____ Date

_____ Cooperative Education Coordinator

Student Employee's Name: _____
Firm: _____
Job Assignment: _____

Points to be Rated	Failure on Job	Needs Improvement	Average	Above Average	Exceptional
APPEARANCE:					
Proper Clothes for Job					
Well Groomed					
Personal Cleanliness					
PERSONALITY:					
Willingness to Learn					
Enthusiasm					
Tactful					
Well Mannered					
DEPENDABILITY:					
Regular Attendance					
Punctuality					
Respects Rules					
Completion of Assigned Tasks					
ATTITUDE:					
Toward Job					
Toward Criticism					
Toward Other Employees					
Toward Customers					
KNOWLEDGE OF JOB:					
Job Procedures					
Selling Methods					
Supervision Required					
Accuracy					
Follows Instructions					

Point to be Rated	Failure on Job	Needs Improvement	Average	Above Average	Exceptional
WORK ACCOMPLISHED:					
Industrious					
Uses Initiative					
Takes Pride					
Quality of Work					
Quantity of Work					

Signed: _____

Title: _____

You may use the reverse side of this sheet for your additional or explanatory remarks.

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APPENDIX F

TEST DEVELOPMENT INSTRUMENT GUIDE

The following excerpts are from a guide developed by Educational Testing Service that is intended to help in the creation of well constructed multiple choice test items.

The elements included in this document are test item terminologies and a checklist used to evaluate the overall quality of individual multiple choice items.

The test development guide can help teachers with minimal test construction training and experience to improve their skill in test contruction, and it will assist them to develop more reliable feedback about how well they are teaching and how much their students know.

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Multiple Choice Item Construction

1. Multiple choice test question terminology

Multiple choice item: a test question in which a number of alternative response choices are given from which the correct answer is to be selected. Most such items use 4 or 5 choices, usually identified by the letters A-E.

Discrete item: a single multiple-choice question, including the choices.

Stem: the initial part of the item in which the task is delineated -- it may be a question, directions, or an incomplete statement.

Options: all the choices in an item.

Key: the correct answer.

Distractors: the incorrect options

Illustration:

Discrete Item

Which of the following was the primary purpose for which craft guilds were formed in the Middle Ages? — Stem

(A) The training of new workmen.
(B) The distribution.....
(C) The social and political advance of their members....
(D) The control of town govts...
(E) The regulation of production. ----- Key

Distractors

Options

Item Sets: two or more items based on a common passage, problem, graph experiment, chart, or other stimulus materials.

Please use the following as a review checklist after completion of your test item. Each of the following statements should be checked ( ) upon completion. If any of the statements do not characterize your test item, it should be revised to meet the checklist criteria.

____1. Does the stem present a single definite problem?

____2. Does the problem presented in the stem adequately test the performance objective?

____3. Is the problem presented clearly and simply? The item should not be a test of reading ability.

____4. Is all the information present in the stem in order for the examinee to understand the intent of the item?

____5. Are the options presented clearly and simply?

____6. Are all the repetitious wordings removed from the options?

____7. Are the options grammatically correct as completions of the stem?

____8. Are the options written in paralled form?

____9. Are the distractors properly worded so that they are not too technical?

____10. Are all of the options written so thay they are not synonymous with any other distractor in the item?

____11. Is the correct response the one on which competent critics would agree?

____12. Are options such as "none of these," "all of these," etc., avoided?

____13. Are direct opposite pairs of options avoided?

Are the distractors written so that they are not significantly different from the correct response with respect to:

____14. Wording, phraseology?

____15. Grammatical construction?

____16. Length?

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